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2002 MAZDA B Series / Bravo Dual Cab OEM Service and Repair Workshop Manual

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Sample

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NO.10 LOW IDLE/STALLS DURING DECELERATION [SKYACTIV-G 2.5T]

SM2897088

id0103q480160

10	LOW IDLE/STALLS DURING DECELERATION
DESCRIPTION	• Engine stops unexpectedly at beginning of deceleration or recovery from deceleration.

Sample

STEP	INSPECTION	RESULTS	ACTION
3	**VERIFY PCM DTC** • Retrieve PCM DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5T)].)
		No	Go to the next step.
4	**VERIFY CURRENT INPUT SIGNAL STATUS** **Caution** **• While performing this step, always operate the vehicle in a safe and lawful manner.** **• When the M-MDS is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the M-MDS using the PID/DATA MONITOR AND RECORD capturing function and inspect later.** • Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) — APP1 — APP2 — BOO — ECT — MAF — MAP — MAP_V — TP_REL — O2S11 — O2S12 — SHRTFT1 — LONGFT1 — ALTT V • Do the PIDs indicate the correct values under the trouble condition? (See PCM INSPECTION [SKYACTIV-G 2.5T].)	Yes	Go to the next step.
		No	APP1, APP2 PIDs are not as specified: • Inspect the APP sensor. (See ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [SKYACTIV-G 2.5T].) BOO PID is not as specified: • Inspect the brake switch. (See BRAKE SWITCH INSPECTION.) ECT PID is not as specified: • Inspect the ECT sensor. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [SKYACTIV-G 2.5T].) MAF PID is not as specified: • Inspect the MAF sensor. (See MASS AIR FLOW (MAF) SENSOR INSPECTION [SKYACTIV-G 2.5T].) MAP, MAP_V PIDs are not as specified: • Inspect the MAP sensor. (See MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION [SKYACTIV-G 2.5T].) TP_REL PID is not as specified: • Inspect the TP sensor. (See THROTTLE POSITION (TP) SENSOR INSPECTION [SKYACTIV-G 2.5T].) O2S11, SHRTFT1, LONGFT1 PIDs are not as specified: • Inspect the A/F sensor. (See AIR FUEL RATIO (A/F) SENSOR INSPECTION [SKYACTIV-G 2.5T].) O2S12 PID is not as specified: • Inspect the HO2S. (See HEATED OXYGEN SENSOR (HO2S) INSPECTION [SKYACTIV-G 2.5T].) ALTT V PID is not as specified: • Inspect the generator. (See GENERATOR INSPECTION [SKYACTIV-G 2.5T].) Repair or replace the malfunctioning part according to the inspection results. • If the malfunction remains: — Inspect communication error between TCM and PCM. • Repair or replace the malfunctioning part according to the inspection results if necessary. — Perform the "INTERMITTENT CONCERN TROUBLESHOOTING" procedure. (See INTERMITTENT CONCERN TROUBLESHOOTING [SKYACTIV-G 2.5T].)

Sample

STEP	INSPECTION	RESULTS	ACTION
11	**INSPECT FUEL PRESSURE (HIGH-SIDE)** • Start the engine and warm it up completely. • Access the FUEL_PRES PID using the M-MDS at idle. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) • Is the FUEL_PRES PID value approx. 3 MPa {31 kgf/cm^2, 435 psi}?	Yes	Go to Step 15.
		No	Lower than 3 MPa {31 kgf/cm^2, 435 psi}: • Inspect the following: — Fuel leakage at the fuel line and fuel injector — Fuel pump • Perform the Fuel Pump (Low-pressure Side) Operation Inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5T].) — Fuel pressure sensor (See HIGH FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-G 2.5T].) (See LOW FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-G 2.5T].) — High pressure fuel pump (See HIGH PRESSURE FUEL PUMP INSPECTION [SKYACTIV-G 2.5T].) • If there is any malfunction: — Repair or replace the malfunctioning part according to the inspection results. • If there is no malfunction: — Go to Step 14. Higher than 3 MPa {31 kgf/cm^2, 435 psi}: • Go to the next step.
12	**DETERMINE IF MALFUNCTION CAUSE IS FUEL PRESSURE SENSOR OR HIGH PRESSURE FUEL PUMP** • Is the vehicle acceleration performance normal?	Yes	Go to the next step.
		No	Go to Step 14.
13	**INSPECT HIGH FUEL PRESSURE SENSOR** • Inspect the high fuel pressure sensor. (See HIGH FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Replace the fuel distributor. (See FUEL INJECTOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
		No	Go to Step 15.
14	**INSPECT SPILL VALVE CONTROL SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO GROUND** • Switch the ignition off. • Disconnect the high pressure fuel pump and PCM connectors. • Inspect for continuity between high pressure fuel pump terminal A (wiring harness-side) and body ground. • Is there continuity?	Yes	Refer to the wiring diagram and verify whether or not there is a common connector between high pressure fuel pump terminal A and PCM terminal 1EE. **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 malfunction remains: • Replace the PCM. (damage to driver in PCM) (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
		No	Replace the high pressure fuel pump. (See HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)

Sample

NO.14 POOR FUEL ECONOMY [SKYACTIV-G 2.5T]

SM2897091

id0103q480200

14	POOR FUEL ECONOMY
DESCRIPTION	• The fuel consumption is high compared to the customer's expectations or the previous fuel consumption.
POSSIBLE CAUSE	**Note** **• The perceived poor fuel economy condition has two causes; the vehicle conditions and how the driver uses the vehicle. Especially, it relies heavily on how the driver uses the vehicle.** • Use of inferior fuel — Ethanol blended — Lower octane • Engine oil malfunction — Improper engine oil level — Engine oil contamination — Improper engine oil viscosity • Improper engine compression • Ignition system malfunction • Improper engine coolant level • Improper tire air pressure • Improper tires, wheels (large size, irregular size) • Improper wheel alignment • Improper ATF level • Brake dragging • Engine operation time is longer than traveled distance — Vehicle is driven in congested traffic frequently — Vehicle left idling for long periods • Amount of fuel injection increases — Vehicle is carrying excess items (luggage) — Frequent acceleration/deceleration — Frequently driving uphill — Travel distances are short (engine does not warm up)

Sample

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	VERIFY ALL SYSTEM DTCs **Note** **• Display the DTCs of all the modules using the M-MDS.** • Retrieve the DTCs of all the modules using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection.
		No	Go to the next step.

NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [SKYACTIV-G 2.5T]

SM2897089

id0103q480170

11	ENGINE STALLS/QUITS-ACCELERATION/CRUISE ENGINE RUNS ROUGH-ACCELERATION/CRUISE MISSES-ACCELERATION/CRUISE BUCK/JERK-ACCELERATION/CRUISE/DECELERATION HESITATION/STUMBLE-ACCELERATION SURGES-ACCELERATION/CRUISE
DESCRIPTION	• Engine stops unexpectedly at beginning of acceleration or during acceleration. • Engine stops unexpectedly while cruising. • Engine speed fluctuates during acceleration or cruising. • Engine misses during acceleration or cruising. • Vehicle bucks/jerks during acceleration, cruising, or deceleration. • Momentary pause at beginning of acceleration or during acceleration. • Momentary minor irregularity in engine output.

Sample

11	ENGINE STALLS/QUITS-ACCELERATION/CRUISE ENGINE RUNS ROUGH-ACCELERATION/CRUISE MISSES-ACCELERATION/CRUISE BUCK/JERK-ACCELERATION/CRUISE/DECELERATION HESITATION/STUMBLE-ACCELERATION SURGES-ACCELERATION/CRUISE
	• Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	VERIFY IF MALFUNCTION INCLUDES HARD ENGINE STARTING • Is the engine unable to start after it has stalled? Note • If the ignition is not switched off (to LOCK or ACC) after the engine stalls, and then an engine restart is attempted, the PCM corrects the difference between CKP sensor and CMP sensor signals caused by engine stalling, which may result in more time needed to restart the engine.	Yes	If the engine is unable to start, perform the symptom troubleshooting "NO.3 WILL NOT CRANK" and "NO.6 CRANKS NORMALLY BUT WILL NOT START". (See NO.3 WILL NOT CRANK [SKYACTIV-G 2.5T].) (See NO.6 CRANKS NORMALLY BUT WILL NOT START [SKYACTIV-G 2.5T].)
		No	Go to the next step.
2	VERIFY IF MALFUNCTION INCLUDES ROUGH IDLING • Does the engine idle rough?	Yes	Perform the symptom troubleshooting "NO.8 ENGINE RUNS ROUGH/ROLLING IDLE". (See NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [SKYACTIV-G 2.5T].)
		No	Go to the next step.
3	VERIFY IF MALFUNCTION CAUSE IS OVERHEATING Caution • While performing this step, always operate the vehicle in a safe and lawful manner. • When the M-MDS is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the M-MDS using the PID/DATA MONITOR AND RECORD capturing function and inspect later. • Access the ECT PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) • Is the ECT PID value less than 116 °C {241 °F} during driving?	Yes	Go to the next step.
		No	The cause of this concern could be from the cooling system overheating. • Perform the symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS-OVERHEATING". (See NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [SKYACTIV-G 2.5T].)

Sample

STEP	INSPECTION	RESULTS	ACTION
7	INSPECT A/C CUT-OFF CONTROL SYSTEM OPERATION • Perform the A/C Cut-off Control System Inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5T].) • Does the A/C cut-off operation work properly?	Yes	Go to the next step.
		No	Perform the symptom troubleshooting "A/C DOES NOT WORK SUFFICIENTLY" and "A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY". (See A/C DOES NOT WORK SUFFICIENTLY [FULL-AUTO AIR CONDITIONER].) (See A/C DOES NOT WORK SUFFICIENTLY [MANUAL AIR CONDITIONER].) (See A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FULL-AUTO AIR CONDITIONER].) (See A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [MANUAL AIR CONDITIONER].)
8	DETERMINE IF MALFUNCTION CAUSE IS DRIVE-BY-WIRE CONTROL SYSTEM OR OTHER • Will the engine run smoothly at part throttle?	Yes	Go to Step 10.
		No	Go to the next step.
9	INSPECT DRIVE-BY-WIRE CONTROL SYSTEM OPERATION • Perform the Electronic Control Throttle Operation Inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5T].) • Does the drive-by-wire control system work properly?	Yes	Visually inspect the throttle body (damage/scratching). • If there is any malfunction: — Repair or replace the malfunctioning part according to the inspection results. • If there is no malfunction: — Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
10	INSPECT FUEL INJECTOR OPERATION • Perform the Fuel Injector Operation Inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5T].) • Do the fuel injectors operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
11	INSPECT PURGE CONTROL SYSTEM OPERATION • Perform the Purge Control System Inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5T].) • Does the purge solenoid valve work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
12	INSPECT CURRENT A/F SENSOR SIGNAL • Inspect the A/F sensor. (See AIR FUEL RATIO (A/F) SENSOR INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 14.

Sample

STEP	INSPECTION	RESULTS	ACTION
18	INSPECT FUEL PRESSURE (LOW-SIDE) • Connect the fuel pressure gauge between fuel pump and high pressure fuel pump. • Measure the low side fuel pressure. (See FUEL LINE PRESSURE INSPECTION [SKYACTIV-G 2.5T].) • Is the low side fuel pressure within specification? **Specification:** • 545–695 kPa {5.56–7.08 kgf/cm^2, 79.1–100.0 psi}	Yes	Go to the next step.
		No	Inspect the following: • Fuel line restriction • Fuel filter clogged — If there is any malfunction: • Repair or replace the malfunctioning part according to the inspection results. — If there is no malfunction: • Replace the fuel pump unit. (See FUEL PUMP UNIT REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
19	INSPECT THROTTLE BODY FOR CLOGGING • Visually inspect the throttle valve. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].) • Is any foreign material adhering around the throttle valve?	Yes	Clean the throttle valve.
		No	Go to the next step.
20	INSPECT ENGINE COMPRESSION • Measure the compression pressure for each cylinder. (See COMPRESSION INSPECTION [SKYACTIV-G 2.5T].) • Are compression pressures within specification?	Yes	Go to Step 26.
		No	Go to the next step.
21	INSPECT ELECTRIC VARIABLE VALVE TIMING DRIVER • Inspect the electric variable valve timing driver. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Replace the electric variable valve timing motor/driver. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
		No	Go to the next step.
22	INSPECT ELECTRIC VARIABLE VALVE TIMING MOTOR • Inspect the electric variable valve timing motor. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Replace the electric variable valve timing motor/driver. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
		No	Go to the next step.
23	INSPECT ELECTRIC VARIABLE VALVE TIMING ACTUATOR • Inspect the electric variable valve timing actuator. (See ELECTRIC VARIABLE VALVE TIMING ACTUATOR INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Replace the electric variable valve timing actuator. (See ELECTRIC VARIABLE VALVE TIMING ACTUATOR, HYDRAULIC VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
		No	Go to the next step.
24	INSPECT HYDRAULIC VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION • Perform the Hydraulic Variable Valve Timing Control System Operation Inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.

Sample

12	LACK/LOSS OF POWER-ACCELERATION/CRUISE
POSSIBLE CAUSE	• Engine overheating • The engine torque control is activated when the engine coolant temperature is high • Drive-by-wire control system operates with brake override system • PCM DTC is stored • Erratic signal to PCM — APP sensor or related circuit malfunction — Communication error between TCM and PCM — ECT sensor or related circuit malfunction — Fuel pressure sensor or related circuit malfunction — IAT sensor No.1 (integrated in MAF sensor/IAT sensor No.1) or related circuit malfunction — MAF sensor or related circuit malfunction — MAP sensor or related circuit malfunction — A/F sensor or related circuit malfunction — HO2S or related circuit malfunction — Boost air temperature sensor or related circuit malfunction — Boost pressure sensor or related circuit malfunction — Improper air/fuel mixture ratio control operation — Intermittent open or short circuit MAF sensor, APP sensor, TP sensor • Improper operation of A/C system • Improper operation of drive-by-wire control system • Throttle body malfunction • Incorrect fuel injection timing • Fuel injector malfunction • Purge solenoid valve malfunction • Fuel leakage • Poor fuel quality • Air leakage or restriction in intake-air system • Vacuum leakage • Air cleaner malfunction — Air cleaner restricted or dirty — Blocking of air cleaner intake port due to hood weatherstrip removal • Charge air cooler malfunction • Brake dragging • Tire air pressure malfunction • Erratic signal from CKP sensor — Loose installation — Damaged trigger wheel (crankshaft pulley) — Open or short circuit in related wiring harness • Erratic or no signal from CMP sensor — Loose installation — Damaged trigger wheel (intake camshaft) — Damaged trigger wheel (exhaust camshaft) — Open or short circuit in related wiring harness • Inadequate fuel pressure (high or low pressure side) — Fuel pressure sensor malfunction — High pressure fuel pump malfunction — Spill valve control solenoid valve control circuit malfunction (damage to driver in PCM caused by short circuit to ground system) — Spill valve control solenoid valve (built-into high pressure fuel pump) malfunction — Relief valve (built-into high pressure fuel pump) malfunction — Fuel line restricted or clogged — Fuel filter clogged (built-into fuel pump unit) — Fuel pump mechanical malfunction — Fuel pump control module malfunction • Throttle valve restricted or clogged • Low engine compression

Sample