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2003 MAZDA 6/Atenza Sedan OEM Service and Repair Workshop Manual

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STEP	INSPECTION	RESULTS	ACTION
13	**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 1DI. **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 2.5 (WITH CYLINDER DEACTIVATION)].)
		No	Replace the high pressure fuel pump. (See HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION [SKYACTIV-G (WITHOUT EGR COOLER)].) (See HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION [SKYACTIV-G (WITH EGR COOLER)].)
14	**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 2.5 (WITH CYLINDER DEACTIVATION)].) • Is the low side fuel pressure within specification? **Specification:** • 405–485 kPa {4.13–4.94 kgf/cm^2, 58.8–70.3 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 2.5 (WITH CYLINDER DEACTIVATION)].)
15	**INSPECT ENGINE COMPRESSION** • Measure the compression pressure for each cylinder. (See COMPRESSION INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • Are compression pressures within specification?	Yes	Go to Step 21.
		No	Go to the next step.
16	**INSPECT ELECTRIC VARIABLE VALVE TIMING DRIVER** • Inspect the electric variable valve timing driver. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the electric variable valve timing motor/driver. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)
		No	Go to the next step.

NO.9 FAST IDLE/RUNS ON [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)]

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9	FAST IDLE/RUNS ON
DESCRIPTION	• Engine speed continues at fast idle after warm-up. • Engine runs after ignition is switched off.
POSSIBLE CAUSE	• Cooling system malfunction • PCM DTC is stored • Accelerator pedal stuck depressed • Erratic signal to PCM — APP sensor or related circuit malfunction — Communication error between TCM and PCM — ECT sensor or related circuit malfunction — A/F sensor or related circuit malfunction — HO2S or related circuit malfunction • Improper load signal input — Improper A/C request signal • Improper operation of drive-by-wire control system • Throttle body malfunction • Fuel injector malfunction • Spill valve control solenoid valve (built-into high pressure fuel pump) malfunction • Air leakage from intake-air system • Injector driver (built-into PCM) malfunction Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage 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 "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual. (See BEFORE SERVICE PRECAUTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) (See AFTER SERVICE PRECAUTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) Caution • 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 matter.

Caution

• Verify the malfunction symptom according to not only the PID value but also the symptom troubleshooting.

Related PIDs

STEP	INSPECTION	RESULTS	ACTION
4	**DETERMINE IF MALFUNCTION CAUSE IS A/C REQUEST SIGNAL OR OTHER** • Access the AC_REQ PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) • Monitor the AC_REQ PID while turning on and off the air conditioner using the switch on the control panel. • Does the AC_REQ PID value change from on to off according to switch control panel?	Yes	Go to the next step.
		No	If the AC_REQ PID is always ON: • Perform the symptom troubleshooting "A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY". (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].) If the AC_REQ PID is always OFF: • Perform the symptom troubleshooting "A/C DOES NOT WORK SUFFICIENTLY". (See A/C DOES NOT WORK SUFFICIENTLY [FULL-AUTO AIR CONDITIONER].) (See A/C DOES NOT WORK SUFFICIENTLY [MANUAL AIR CONDITIONER].)
5	**DETERMINE IF MALFUNCTION CAUSE IS DRIVE-BY-WIRE CONTROL SYSTEM OR OTHER** • Will the engine run smoothly at part throttle?	Yes	Go to Step 7.
		No	Go to the next step.
6	**INSPECT DRIVE-BY-WIRE CONTROL SYSTEM OPERATION** • Perform the Electronic Control Throttle Operation Inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • 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.
7	**INSPECT FUEL INJECTOR OPERATION** • Perform the Fuel Injector Operation Inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • Do the fuel injectors operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
8	**INSPECT HIGH PRESSURE FUEL PUMP** • Inspect the high pressure fuel pump. (See HIGH PRESSURE FUEL PUMP INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the high pressure fuel pump. (See HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION [SKYACTIV-G (WITHOUT EGR COOLER)].) (See HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION [SKYACTIV-G (WITH EGR COOLER)].)
		No	Go to the next step.
9	**INSPECT INTAKE-AIR SYSTEM FOR AIR LEAKAGE** • Inspect for leakage in intake-air system. • Is there any leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Injector driver malfunction. • Replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) If the problem remains, overhaul the engine.
10	Verify the test results. • If normal, return to the diagnostic index to service any additional symptoms. (See SYMPTOM DIAGNOSTIC INDEX [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • If the malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. — If the vehicle is repaired, troubleshooting is completed. — If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest.		

10	LOW IDLE/STALLS DURING DECELERATION
POSSIBLE CAUSE	• PCM DTC is stored • Erratic signal to PCM — APP sensor or related circuit malfunction — Brake switch or related circuit malfunction — Communication error between TCM and PCM — ECT sensor 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 — TP sensor or related circuit malfunction — Generator malfunction (part, system, control malfunction) • Amount of generator voltage is large • Improper operation of A/C magnetic clutch • Improper operation of drive-by-wire control system • Incorrect fuel injection timing • Fuel injector malfunction • Purge solenoid valve malfunction • Poor fuel quality • Air leakage from intake-air system • Intake-air system restriction • Fuel leakage • Vacuum leakage • Engine mount installation loose • Erratic signal from intake CMP sensor — Loose installation — Damaged trigger wheel (intake camshaft and/or exhaust camshaft) — Open or short circuit in related wiring harness • Erratic signal from CKP sensor — Loose installation — Damaged trigger wheel (crankshaft pulley) — Open or short circuit in related wiring harness • Inadequate fuel pressure (high or low pressure side) — Fuel pressure sensor or related circuit 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 restriction — Fuel filter clogged — Fuel pump unit malfunction • ATX malfunction • Low engine compression • Improper operation of electric variable valve timing control system — Electric variable valve timing driver malfunction — Electric variable valve timing motor malfunction — Electric variable valve timing actuator malfunction • Improper operation of hydraulic variable valve timing control system • Injector driver (built-into PCM) malfunction **Warning** **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**

STEP	INSPECTION	RESULTS	ACTION
3	VERIFY PCM DTC • Retrieve PCM DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].)
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
10	INSPECT RELATED PART CONDITION • Inspect the following: — Fuel quality (proper octane, contamination, winter/summer blend) — Intake-air system restriction or leakage — Fuel leakage in fuel system — Vacuum leakage — Engine mount loose — CKP sensor, intake CMP sensor and exhaust CMP sensor • Installation condition (See CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) (See CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • Damaged trigger wheel, intake camshaft and exhaust camshaft • Is there any malfunction?	Yes	Service if necessary. • Repeat this step.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
19	**INSPECT ELECTRIC VARIABLE VALVE TIMING MOTOR** • Inspect the electric variable valve timing motor. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the electric variable valve timing motor/driver. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)
		No	Go to the next step.
20	**INSPECT ELECTRIC VARIABLE VALVE TIMING ACTUATOR** • Inspect the electric variable valve timing actuator. (See ELECTRIC VARIABLE VALVE TIMING ACTUATOR INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • 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 2.5 (WITH CYLINDER DEACTIVATION)].)
		No	Go to the next step.
21	**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 2.5 (WITH CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
22	**INSPECT FOR MALFUNCTION DUE TO DEVIATED VALVE TIMING** • Inspect the valve timing (timing chain installation condition). (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-G (WITHOUT EGR COOLER)].) (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-G (WITH EGR COOLER)].) • Is the valve timing normal?	Yes	Inspect for the following engine internal parts: • Cylinder • Piston ring • Intake valve • Exhaust valve • Such as cylinder head gasket — If there is any malfunction: • Repair or replace the malfunctioning part according to the inspection results.
		No	Adjust the valve timing to the correct timing.

11	ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES
POSSIBLE CAUSE	• 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 • Low engine compression • Improper intake valve timing • Improper exhaust valve timing • Improper operation of electric variable valve timing control system — Electric variable valve timing driver malfunction — Electric variable valve timing motor malfunction — Electric variable valve timing actuator malfunction • Improper operation of hydraulic variable valve timing control system • Spark plug malfunction • Exhaust system and/or TWC restriction (PCM DTC is stored.) • PCV valve malfunction • Injector driver (built-into PCM) malfunction Warning • The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: — Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. — Highly pressurized fuel may spray out if the fuel line is cut. Due to the following dangers occurring with a fuel spray, always complete the "Fuel Line Safety Procedure" to prevent the fuel from spraying. (See BEFORE SERVICE PRECAUTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • Fuel may cause irritation if it comes in contact with skin and eyes. • If fuel ignites and causes a fire, it may lead to serious injury or death, and damage to property and facilities. — Fuel is highly flammable and dangerous. Fuel line spills and leakage can cause serious injury or death, and damage to equipment. Always refer to the "Quick Release Connector Removal/Installation (fuel system)" before performing the fuel hose installation, and execute the "Fuel Leakage Inspection" after installation. (See QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) (See AFTER SERVICE PRECAUTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) Caution • 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.

Caution

• Verify the malfunction symptom according to not only the PID value but also the symptom troubleshooting.

STEP	INSPECTION	RESULTS	ACTION
6	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 2.5 (WITH CYLINDER DEACTIVATION))].) — APP1 — APP2 — ECT — FUEL_PRES — IAT — MAF — MAP — MAP_V — O2S11 — O2S12 — SHRTFT1 — LONGFT1 • Do the PIDs indicate the correct values under the trouble condition? (See PCM INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)	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 2.5 (WITH CYLINDER DEACTIVATION)].) ECT PID is not as specified: • Inspect the ECT sensor. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [SKYACTIV-G (WITHOUT EGR COOLER)].) (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [SKYACTIV-G (WITH EGR COOLER)].) FUEL_PRES PID is not as specified: • Inspect the fuel pressure sensor. (See FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-G (WITHOUT EGR COOLER)].) (See HIGH FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-G (WITH EGR COOLER)].) IAT PID is not as specified: • Inspect the IAT sensor No.1. (See INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) MAF PID is not as specified: • Inspect the MAF sensor. (See MASS AIR FLOW (MAF) SENSOR INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) MAP, MAP_V PIDs are not as specified: • Inspect the MAP sensor. (See MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) O2S11, SHRTFT1, LONGFT1 PIDs are not as specified: • Inspect the A/F sensor. (See AIR FUEL RATIO (A/F) SENSOR INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) O2S12 PID is not as specified: • Inspect the HO2S. (See HEATED OXYGEN SENSOR (HO2S) INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) 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 2.5 (WITH CYLINDER DEACTIVATION)].)