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

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STEP	INSPECTION	RESULTS	ACTION
3	**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))].) — ECT — MAF — MAP — MAP_V — O2S11 — O2S12 — SHRTFT1 — LONGFT1 • Do the PIDs indicate the correct values under the malfunction condition? (See PCM INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)	Yes	Go to the next step.
		No	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)].) 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: — Perform the "INTERMITTENT CONCERN TROUBLESHOOTING" procedure. (See INTERMITTENT CONCERN TROUBLESHOOTING [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)
4	**DETERMINE IF MALFUNCTION CAUSE IS DRIVE-BY-WIRE CONTROL SYSTEM OR OTHER** • Will the engine run smoothly at part throttle?	Yes	Go to Step 6.
		No	Go to the next step.
5	**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.
6	**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.

STEP	INSPECTION	RESULTS	ACTION
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 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)].)
15	**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?	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)].)
16	**INSPECT STARTING SYSTEM** • Inspect the starting system. (See STARTER INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • Does the starting system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
17	**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 23.
		No	Go to the next step.
18	**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.5 ENGINE STALLS-AFTER START/AT IDLE [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)]

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5	ENGINE STALLS-AFTER START/AT IDLE
DESCRIPTION	• Stalling occurs if vehicle is left idling under no load. • Stalling occurs when load (electric, A/C) is applied during idling. • Stalling occurs if the accelerator pedal is depressed from an idling condition when accelerating from a stop.

Item (definition)	Unit/Condition	Definition	Condition/Specification (Reference)
MAF	g/Sec	Mass air flow	• Displays MAF
	V		• Ignition switched ON (engine off) (MAF: 0.00 g/s {0 lb/min}): Approx. 1.69 V (ECT is 53 °C {127 °F}) • Idle (after warm up) (MAF: 2.50 g/s {0.331 lb/min}): Approx. 1.89 V (ECT is 93 °C {199 °F}) • Racing (engine speed is 2,000 rpm) (MAF: 3.80 g/s {0.503 lb/min}): Approx. 2.02 V (ECT is 95 °C {203 °F})
MAP	KPa {MPA}, mBar {BAR}, psi, in H20	Manifold absolute pressure	• Displays MAP
MAP_V	V	MAP sensor voltage	• Ignition switched ON (engine off) (MAP: 100 kPa {1.02 kgf/cm ^{2}, 14.5 psi}): Approx. 4.04 V • Idle (after warm up) (MAP: 35 kPa {0.36 kgf/cm ^{2}, 5.1 psi}): Approx. 1.40 V • Racing (engine speed is 2,000 rpm) (MAP: 26 kPa {0.27 kgf/cm ^{2}, 3.8 psi}): Approx. 1.01 V
O2S11	µA	A/F sensor	• Idle (after warm up): Approx. -39 µA • Deceleration fuel cut (accelerator pedal released from engine speed of 4,000 rpm or more): Approx. 3.84 mA
O2S12	V	HO2S	• Idle (after warm up): 0−1.0 V • Deceleration fuel cut (accelerator pedal released from engine speed of 4,000 rpm or more): Approx. 0 V
RPM	RPM	Engine speed	• Displays engine speed
SHRTFT1	%	Short term fuel trim	• Idle (after warm up): Approx. 2.34% • Racing (engine speed is 2,000 rpm): Approx. 3.9% • Racing (engine speed is 4,000 rpm): Approx. 1.56%
TP_REL	%	Throttle position signal (relative value)	• Accelerator pedal released: Approx. 12% • Accelerator pedal depressed: Approx. 82%
VPWR	V	Battery positive voltage	• Displays battery voltage
VSS	KPH, MPH	Vehicle speed	• Displays vehicle speed

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	**VERIFY TIMING OCCURRING MALFUNCTION** • Verify the symptom. • Does the malfunction symptom occur just after the engine is started?	Yes	Perform the symptom troubleshooting "NO.4 HARD TO START/LONG CRANK/ERRATIC START/ERRATIC CRANK". (See NO.4 HARD TO START/LONG CRANK/ERRATIC START/ERRATIC CRANK [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)
		No	Go to the next step.
2	**VERIFY IF MALFUNCTION INCLUDES ROUGH IDLING** • Verify the symptom. • 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 2.5 (WITH CYLINDER DEACTIVATION)].)
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
6	**INSPECT MAIN RELAY CIRCUIT FOR SHORT TO GROUND** • Switch the ignition off. • Remove the main relay. (See RELAY LOCATION.) • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — Main relay terminal C — Main relay terminal E • 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: • 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 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 (WITH CYLINDER DEACTIVATION)].) Go to Step 31.
		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 connector and/or terminals, then go to Step 31.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
16	**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 2.5 (WITH CYLINDER DEACTIVATION))].) • Is the FUEL_PRES PID value approx. 10 MPa {102 kgf/cm^2, 1,450 psi}?	Yes	Go to Step 20.
		No	Lower than 10 MPa {102 kgf/cm^2, 1,450 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 2.5 (WITH CYLINDER DEACTIVATION)].) — Fuel pressure sensor (See FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-G (WITHOUT EGR COOLER)].) (See HIGH FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-G (WITH EGR COOLER)].) — High pressure fuel pump (See HIGH PRESSURE FUEL PUMP INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • If there is any malfunction: — Repair or replace the malfunctioning part according to the inspection results. • If there is no malfunction: — Go to Step 19. Higher than 10 MPa {102 kgf/cm^2, 1,450 psi}: • Go to the next step.
17	**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 19.
18	**INSPECT FUEL PRESSURE SENSOR** • 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)].) • Is there any malfunction?	Yes	Replace the fuel distributor. (See FUEL INJECTOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)
		No	Go to Step 20.

STEP	INSPECTION	RESULTS	ACTION
31	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.		

8	ENGINE RUNS ROUGH/ROLLING IDLE
POSSIBLE CAUSE	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

Item (definition)	Unit/Condition	Definition	Condition/Specification (Reference)
AC_REQ	Off/On	A/C request signal	• A/C switch off: Off • A/C switch on: On
APP1	%	APP sensor No.1	• Accelerator pedal released: Approx. 15% • Accelerator pedal depressed: Approx. 90.58%
	V		• Accelerator pedal released: Approx. 0.75 V • Accelerator pedal depressed: Approx. 4.52 V
APP2	%	APP sensor No.2	• Accelerator pedal released: Approx. 7.45% • Accelerator pedal depressed: Approx. 45.49%
	V		• Accelerator pedal released: Approx. 0.38 V • Accelerator pedal depressed: Approx. 2.26 V
ECT	°C, °F	Engine coolant temperature	• Displays ECT
	V		• ECT is 20 °C {68 °F}: Approx. 3.10 V • ECT is 40 °C {104 °F}: Approx. 2.16 V • ECT is 60 °C {140 °F}: Approx. 1.40 V • ECT is 80 °C {176 °F}: Approx. 0.87 V • ECT is 100 °C {212 °F}: Approx. 0.54 V
FUEL_PRES	KPa {MPA}, mBar {BAR}, psi, in H20	Fuel pressure	• Displays fuel pressure
	V		Idle (ECT 80 °C {176 °F}) • Fuel pressure is 10 MPa {102 kgf/cm ^{2}, 1450 psi}: Approx. 1.4 V
LOAD	%	Engine load	• Idle (after warm up): Approx. 16.07% • Racing (engine speed is 2,000 rpm): Approx. 13.33% • Racing (engine speed is 4,000 rpm): Approx. 15.29%
LONGFT1	%	Long term fuel trim	• Idle (after warm up): Approx. -3.9% • Racing (engine speed is 2,000 rpm): Approx. -0.78% • Racing (engine speed is 4,000 rpm): Approx. -0.78%

STEP	INSPECTION	RESULTS	ACTION
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 2.5 (WITH CYLINDER DEACTIVATION))].) — APP1 — APP2 — ECT — MAF — MAP — MAP_V — O2S11 — O2S12 — SHRTFT1 — LONGFT1 • Do the PIDs indicate the correct values under the malfunction 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)].) 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: — Perform the "INTERMITTENT CONCERN TROUBLESHOOTING" procedure. (See INTERMITTENT CONCERN TROUBLESHOOTING [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)
5	**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].)