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2002 MAZDA 626 (Mk.5) Hatchback OEM Service and Repair Workshop Manual

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STEP	INSPECTION	RESULTS	ACTION
3	**INSPECT INTAKE AIR SYSTEM** • Visually inspect for air suction, leakage and perforation in the intake air system. • Is the intake air system normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 9.
4	**INSPECT EXHAUST SYSTEM FOR LEAKAGE** • Visually inspect for exhaust gas leakage from the exhaust system. • Is the exhaust system normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 9.
5	**INSPECT SLIPPAGE OF BELTS FOR ENGINE ACCESSORIES** • Inspect slippage of the belts for the engine accessories. (See DRIVE BELT INSPECTION [SKYACTIV-D 2.2].) (See DRIVE BELT AUTO TENSIONER INSPECTION [SKYACTIV-D 2.2].) • Are the belts for the engine accessories normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 9.
6	**INSPECT TURBOCHARGER** • Inspect the turbocharger. (See TURBOCHARGER INSPECTION [SKYACTIV-D 2.2].) • Is the turbocharger normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 9.
7	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See COMPRESSION INSPECTION [SKYACTIV-D 2.2].) • Are compression pressures within specification?	Yes	Go to Step 9.
		No	Go to the next step.
8	**INSPECT FOR MALFUNCTION DUE TO DEVIATED VALVE TIMING** • Inspect the valve timing (timing chain installation condition). (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) • Is the valve timing normal?	Yes	Go to the next step.
		No	Adjust the valve timing to the correct timing, then go to the next step.
9	Verify the test results. • If normal, return to the diagnostic index to service any additional symptoms. (See SYMPTOM DIAGNOSTIC INDEX [SKYACTIV-D 2.2].) • 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.		

STEP	INSPECTION	RESULTS	ACTION
4	**INSPECT FUEL INJECTION RELATED PARTS** • Inspect the following parts: — Common rail (See COMMON RAIL INSPECTION [SKYACTIV-D 2.2].) — Supply pump (See SUPPLY PUMP INSPECTION [SKYACTIV-D 2.2].) — Suction control valve (See SUCTION CONTROL VALVE INSPECTION [SKYACTIV-D 2.2].) — Fuel injector (See FUEL INJECTOR INSPECTION [SKYACTIV-D 2.2].) — Fuel pressure relief valve (See FUEL PRESSURE RELIEF VALVE INSPECTION [SKYACTIV-D 2.2].) — Jet pump (AWD) (See JET PUMP INSPECTION [SKYACTIV-D 2.2].) • Are all items normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
5	**VERIFY ATX RELATED DTC** • Retrieve TCM DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC SYSTEM DTC INSPECTION [TCM (GW6A-EL, GW6AX-EL)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See ON-BOARD DIAGNOSTIC SYSTEM DTC TABLE [TCM (GW6A-EL, GW6AX-EL)].)
		No	Go to the next step.
6	**VERIFY MALFUNCTION SYMPTOM RELATED TO ATX** • Verify the malfunction symptom related to the ATX. (See SYMPTOM TROUBLESHOOTING ITEM TABLE [GW6A-EL, GW6AX-EL].) • Is a malfunction occurring which is applicable to the symptom diagnostic index?	Yes	Go to the applicable symptom troubleshooting. (See SYMPTOM TROUBLESHOOTING ITEM TABLE [GW6A-EL, GW6AX-EL].)
		No	Go to the next step.
7	**INSPECT FOR MALFUNCTION DUE TO POOR FUEL** • Replace the fuel. (See FUEL DRAINING PROCEDURE [SKYACTIV-D 2.2].) • Does the symptom disappear?	Yes	Advise the customer as to the change in the fuel used.
		No	Remove the accumulated matter in the cylinder head using the following procedure, then go to the next step. • Carbon remover • Overhauling
8	**DETERMINE IF MALFUNCTION IS DUE TO EXCESSIVE ENGINE SPEED RESISTANCE** • Rotate the crankshaft pulley lock bolt clockwise using a wrench. (See FRONT OIL SEAL REPLACEMENT [SKYACTIV-D 2.2].) • Can bolts be rotated?	Yes	Go to Step 10.
		No	Go to the next step.
9	**INSPECT FOR MALFUNCTION DUE TO EXCESSIVE MECHANICAL RESISTANCE OF ENGINE ACCESSORIES** • Remove all drive belts from engine accessories. (See DRIVE BELT REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) **Caution** **• Do not run the engine for long periods with the drive belts of engine accessories removed. Otherwise the engine could be damaged from overheating.** • Start the engine. • Is cranking possible? (Does the engine start?)	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14. (Large mechanical resistance in engine accessories.)
		No	Go to the next step.
10	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See COMPRESSION INSPECTION [SKYACTIV-D 2.2].) • Are compression pressures within specification?	Yes	Go to Step 14.
		No	Go to the next step.

NO.30 SCR SYSTEM WARNING INDICATION TURNED ON OR FLASHES/MESSAGE RELATED TO SCR SYSTEM INDICATED IN DISPLAY [SKYACTIV-D 2.2]

SM3065992

id0103g196620

30	SCR SYSTEM WARNING INDICATION TURNED ON OR FLASHES/MESSAGE RELATED TO SCR SYSTEM INDICATED IN DISPLAY
DESCRIPTION	• The following messages are indicated in the display. — "Refill DEF Speed Will Be Limited to 50MPH in 200 Miles" — "Refill DEF Speed Will Be Limited to 30MPH in 200 Miles" — "Refill DEF Now Engine Will Go into Forced Idle Mode in 200 Miles" — "Forced Idle Mode On: DEF Empty Refill Now" — "Forced Idle Mode On: DEF Empty Refill Now" — "SCR Malfunction Engine Will Go into Forced Idle Mode in 125 Miles" — "Forced Idle Mode On: SCR Malfunction"
POSSIBLE CAUSE	• Improper diesel exhaust fluid (DEF) level • PCM DTC is stored. • Dosing control unit DTC is stored. • SCR system malfunction — Urea injector malfunction — DEF pump malfunction — Urea hose malfunction (Diesel Exhaust Fluid (DEF) leakage) — Urea tank malfunction (Diesel Exhaust Fluid (DEF) leakage) — Urea level sensor malfunction — Urea temperature sensor malfunction — DEF quality sensor malfunction — Urea tank heater malfunction — Urea hose heater malfunction • Exhaust gas temperature sensor No.4 malfunction • Exhaust gas temperature sensor No.5 malfunction • NOx sensor No.1/No.2 malfunction • Improper Diesel Exhaust Fluid (DEF) used • Inferior fuel used (sulfur content is high) • Instrument cluster malfunction

Diagnostic Procedure

NO.31 SCR SYSTEM WARNING INDICATION TURNED ON/[OVERFILLED DEF] INDICATED IN DISPLAY [SKYACTIV-D 2.2]

SM3065993

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31	SCR SYSTEM WARNING INDICATION TURNED ON/[OVERFILLED DEF] INDICATED IN DISPLAY
DESCRIPTION	• The following messages are indicated in the display. — "Overfilled DEF. Drain excess DEF as soon as possible"
POSSIBLE CAUSE	• Diesel exhaust fluid (DEF) overfill • Improper diesel exhaust fluid (DEF) level • PCM DTC is stored. • Instrument cluster malfunction

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	**INSPECT FOR MALFUNCTION DUE TO DIESEL EXHAUST FLUID (DEF) OVERFILL** • Verify the Diesel Exhaust Fluid (DEF) level. **Without multi-information display** — Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) • RE_TANK_LV **With multi-information display** — Press the INFO switch to verify the Diesel Exhaust Fluid (DEF) level in the multi information display. • Is the Diesel Exhaust Fluid (DEF) level 100 %?	Yes	Drain the Diesel Exhaust Fluid (DEF) until the level reaches 85 to 100 %. (See DIESEL EXHAUST FLUID (DEF) REPLACEMENT [SKYACTIV-D 2.2].) Go to Step 5.
		No	Go to the next step.
2	**VERIFY PCM DTC** • Retrieve PCM DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-D 2.2)].)
		No	Go to the next step.
3	**INSPECT UREA LEVEL SENSOR** • Inspect the urea level sensor. (See UREA LEVEL SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is the urea level sensor normal?	Yes	Go to the next step.
		No	Replace the urea level sensor, then go to Step 5. (See UREA LEVEL SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
4	**INSPECT INSTRUMENT CLUSTER** • Inspect the instrument cluster. (See INSTRUMENT CLUSTER INSPECTION.) • Is the instrument cluster normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to the next step. (See INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)

4	HARD TO START/LONG CRANK/ERRATIC START/ERRATIC CRANK
POSSIBLE CAUSE	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. • Engine overheating • PCM DTC is stored • Erratic signal to 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 — Improper air/fuel mixture ratio control • Improper operation of drive-by-wire control system • Incorrect fuel injection timing • Fuel injector malfunction • Purge solenoid valve malfunction • Contamination in MAF sensor • Under the condition in which the engine starts and stops repeatedly while the vehicle is not driven, the fuel injected prior to complete ignition during engine start may drop into the oil pan from the cylinder and mix with the engine oil. The situation in which excess quantities of fuel continue to be injected due to an engine coolant temperature signal error is the same. • Intermittent open circuit in PCM ground circuit • Poor fuel quality • Fuel leakage • Air leakage from intake-air system • Vacuum leakage • Intake-air system restriction • Improper engine oil viscosity • Erratic signal from CKP sensor — Loose installation — Damaged trigger wheel (crankshaft pulley) — Open or short circuit in related wiring harness • Erratic 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 malfunction (built-into high pressure fuel pump) — Relief valve (built-into high pressure fuel pump) malfunction — Fuel line restriction — Fuel filter clogged (built-into fuel pump unit) — Fuel pump unit malfunction • Starting system 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

STEP	INSPECTION	RESULTS	ACTION
5	**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.
6	**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.
7	**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.
8	**INSPECT MAF SENSOR** • Inspect the MAF sensor for the following: — Contamination • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
9	**INSPECT PCM FOR POOR GROUND** • Verify the PCM ground point condition. • Is there any ground point loose or lifting in the PCM?	Yes	Repair the ground point.
		No	Go to the next step.
10	**INSPECT RELATED PART CONDITION** • Inspect the following: — Fuel quality (proper octane, contamination, winter/summer blend) — Fuel leakage — Intake-air system leakage or restriction — Vacuum leakage — Engine oil viscosity — CKP sensor and intake CMP sensor • Installation condition (See CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].) (See CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].) • Damaged trigger wheel (intake camshaft) — Exhaust CMP sensor • Installation condition (See CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].) • Damaged trigger wheel (exhaust camshaft) • Is there any malfunction?	Yes	Service if necessary. • Repeat this step.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
20	**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.
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 2.5T].) • 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 2.5T].) • 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.
23	**INSPECT IGNITION SYSTEM OPERATION** • Perform the Spark Test. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5T].) • Is a strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
24	**INSPECT EXHAUST SYSTEM FOR RESTRICTION** • Inspect for restriction in the exhaust system and the TWC. • Is there any restriction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
25	**INSPECT IF MALFUNCTION CAUSE IS PCV VALVE OR INJECTOR DRIVER (PCM INTEGRATED)** • Inspect the PCV valve. (See POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Replace the PCV valve. (See POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
		No	Injector driver malfunction. • Replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].) If the problem remains, overhaul the engine.
26	Verify the test results. • If normal, return to the diagnostic index to service any additional symptoms. (See SYMPTOM DIAGNOSTIC INDEX [SKYACTIV-G 2.5T].) • 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.		

5	ENGINE STALLS-AFTER START/AT IDLE
	• Injector driver (built-into PCM) malfunction
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. — 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 2.5T].) • 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 2.5T].) (See AFTER SERVICE PRECAUTION [SKYACTIV-G 2.5T].) 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.

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 2.5T].)
		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 2.5T].)
		No	Go to the next step.