NO.6 CRANKS NORMALLY BUT WILL NOT START [SKYACTIV-G 2.0]

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6	CRANKS NORMALLY BUT WILL NOT START
DESCRIPTION	• Starter cranks engine at normal speed but engine will not run. • Refer to symptom troubleshooting “NO.5 ENGINE STALLS-AFTER START/AT IDLE” if this symptom appears after engine stalls. • Fuel is in tank. • Battery is in normal condition.
POSSIBLE CAUSE	• Because engine is started with accelerator pedal fully depressed, it goes into dechoke mode and fuel is not injected • Engine overheating • PCM DTC is stored • Erratic signal to PCM — APP sensor or related circuit malfunction — ECT sensor or related circuit malfunction — MAF sensor or related circuit malfunction — A/F sensor or related circuit malfunction — HO2S or related circuit malfunction — Improper air/fuel mixture ratio control • Power is not supplied from main relay • Power is not supplied from fuel injector relay and/or fuel pump relay • Improper operation of drive-by-wire control system • Purge solenoid valve malfunction • No signal from MAF sensor • Poor fuel quality • Air leakage from intake-air system • Intake-air system restriction • Electrical connector disconnected • No battery power supply to PCM or poor ground • Fuse malfunction • Fuel leakage • Vacuum leakage • No signal from CMP sensor — Loose installation — Damaged trigger wheel (exhaust camshaft) — Open or short circuit in related wiring harness • No 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) — Open or short circuit in the fuel pump (low-side) body or related wiring harness — 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 malfunction (built-into high pressure fuel pump) — Fuel line restriction — Fuel filter clogged — Fuel pump (low-side) body mechanical malfunction • Incorrect fuel injection timing • Fuel injector malfunction • Improper operation of electric variable valve timing control system (PCM DTC is stored.) • Improper operation of hydraulic variable valve timing control system • Low engine compression • Improper intake valve timing • Improper exhaust valve timing • Ignition system malfunction • Ignition coil malfunction • Vapor occurs around fuel pump (fuel problem) • Because vapor occurs in high pressure fuel pump, fuel injector cannot adjust fuel injection to correct amount • Exhaust system and/or TWC restricted or clogged • PCV valve malfunction • Injector driver (built-into PCM) malfunction

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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 2.0].) (See AFTER SERVICE PRECAUTION [SKYACTIV-G 2.0].)** **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	**INSPECT EFFECT OF VEHICLE CONDITION FOR MALFUNCTION** • Verify how the customer drives the vehicle by asking the customer the following: — Because engine is started with accelerator pedal fully depressed, it goes into dechoke mode and fuel is not injected • Is the engine started with accelerator pedal fully depressed?	Yes	Explain to the customer that the vehicle is normal and give them advice on how to start the engine and a specific example of the conditions in which the engine goes into dechoke mode.
		No	Go to the next step.
2	**VERIFY IF MALFUNCTION CAUSE IS OVERHEATING** • Access the ECT PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0].) • 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 2.0].)
3	**VERIFY PCM DTC** • Retrieve any DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [SKYACTIV-G 2.0].)
		No	Go to the next step.

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 [SKYACTIV-G 2.0].) — APP1 — APP2 — ECT — MAF — O2S11 — O2S12 — SHRTFT1 — LONGFT1 • Do the PIDs indicate the correct values under the trouble condition? (See PCM INSPECTION [SKYACTIV-G 2.0].)	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 2.0].) ECT PID is not as specified: • Inspect the ECT sensor. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [SKYACTIV-G 2.0].) MAF PID is not as specified: • Inspect the MAF sensor. (See MASS AIR FLOW (MAF) SENSOR INSPECTION [SKYACTIV-G 2.0].) O2S11, SHRTFT1, LONGFT1 PIDs are not as specified: • Inspect the A/F sensor. (See AIR FUEL RATIO (A/F) SENSOR INSPECTION [SKYACTIV-G 2.0].) O2S12 PID is not as specified: • Inspect the HO2S. (See HEATED OXYGEN SENSOR (HO2S) INSPECTION [SKYACTIV-G 2.0].) 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 2.0].)
5	**DETERMINE IF MALFUNCTION CAUSE IS DRIVE-BY-WIRE CONTROL SYSTEM OR OTHER** • Will the engine run smoothly at part throttle?	Yes	Go to the next step.
		No	Go to Step 7.
6	**INSPECT DRIVE-BY-WIRE CONTROL SYSTEM OPERATION** • Perform the TP sweep inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.0].)	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.
	• Does the drive-by-wire control system work properly?	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 2.0].) • 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	**VERIFY IF MALFUNCTION CAUSE IS MAF SENSOR SIGNAL** **Note** • If the inspection in Step 8 is performed, the PCM detects a DTC and performs fail-safe control. After performing the inspection, clear DTCs using the M-MDS. • Switch the ignition to off. • Disconnect the MAF sensor/IAT sensor No.1 connector. • Start the engine. • Does the engine start normally?	Yes	Clean the MAF sensor. Verify that the symptom is solved. • If the symptom remains, inspect the MAF sensor related wiring harness and connector. — If there is any malfunction: • Repair or replace the malfunctioning part according to the inspection results. — If there is no malfunction: • Replace the MAF sensor/IAT sensor No.1. (See INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [SKYACTIV-G 2.0].)
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
9	**INSPECT FUEL INJECTOR RELAY** • Switch the ignition to off. • Remove the fuel injector relay. • Inspect the fuel injector relay. (See RELAY INSPECTION.) • Is there any malfunction?	Yes	Replace the fuel injector relay.
		No	Reinstall the fuel injector relay, then go to the next step.
10	**INSPECT FUEL PUMP RELAY** • Remove the fuel pump relay. • Inspect the fuel pump relay. (See RELAY INSPECTION.) • Is there any malfunction?	Yes	Replace the fuel pump relay.
		No	Inspect for short or open circuit between the following terminals: • IG1 relay terminal C—PCM terminal 2AQ • Battery positive terminal—PCM terminal 1CO • Battery positive terminal—PCM terminal 1CS • Battery positive terminal—PCM terminal 1CW • Battery positive terminal—PCM terminal 1DA • Battery positive terminal—PCM terminal 1DG • Battery positive terminal—PCM terminal 1DK • PCM terminal 2S—Body ground — If there is any malfunction: • Repair or replace the malfunctioning part according to the inspection results. — If there is no malfunction: • Reinstall the fuel pump relay, then go to the next step.
11	**INSPECT RELATED PART CONDITION** • Inspect the following: — Fuel quality (proper octane, contamination, winter/summer blend) — Intake-air system leakage or restriction — Electrical connectors — Poor connection for PCM ground and body ground — Fuses — Fuel leakage — Vacuum leakage — CKP sensor and exhaust CMP sensor • Installation condition (See CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.0].) (See CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.0].) • 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
12	**INSPECT FUEL PRESSURE (HIGH-SIDE)** • Access the FUEL_PRES PID using the M-MDS while cranking the engine. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0].) • Is the FUEL_PRES PID value within specification? **Specification:** **• 4—6 MPa {41—61 kgf/cm^2, 581—870 psi}**	Yes	Go to Step 14.
		No	Lower than specification: • 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 2.0].) — Fuel pressure sensor (See FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-G 2.0].) — High pressure fuel pump (See HIGH PRESSURE FUEL PUMP INSPECTION [SKYACTIV-G 2.0].) • 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. Higher than specification: • Go to the next step.
13	**INSPECT SPILL VALVE CONTROL SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO GROUND** • Switch the ignition to 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	Repair or replace the wiring harness for a possible short to ground. • If the malfunction remains: — Replace the PCM. (damage to driver in PCM) (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)
		No	Replace the high pressure fuel pump. (See HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)
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 2.0].) • 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 2.0].)
15	**INSPECT FUEL INJECTOR OPERATION** • Perform the Fuel Injector Operation Inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.0].) • Do the fuel injectors operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
16	**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 2.0].) • Does the hydraulic variable valve timing control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.

STEP	INSPECTION	RESULTS	ACTION
17	**INSPECT FUEL TANK** • Inspect the fuel tank. (See FUEL TANK INSPECTION [SKYACTIV-G 2.0].) • Is vapor occurring?	Yes	Replace the fuel tank. (See FUEL TANK REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)
		No	Go to the next step.
18	**INSPECT HIGH PRESSURE FUEL PUMP** • Inspect the high pressure fuel pump. (See HIGH PRESSURE FUEL PUMP INSPECTION [SKYACTIV-G 2.0].) • Is there any malfunction?	Yes	Replace the high pressure fuel pump. (See HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)
		No	Go to the next step.
19	**INSPECT ENGINE COMPRESSION** • Measure the compression pressure for each cylinder. (See COMPRESSION INSPECTION [SKYACTIV-G 2.0].) • Are compression pressures within specification? **Specification:** • Compression [European (L.H.D. U.K.) specs.] — Standard: **978 kPa {9.97 kgf/cm^2, 142 psi} (300 rpm)** — Minimum: **783 kPa {7.98 kgf/cm^2, 114 psi} (300 rpm)** — Maximum difference between cylinders: **166 kPa {1.69 kgf/cm^2, 24.1 psi}** • Compression [Except European (L.H.D. U.K.) specs.] — Standard: **885 kPa {9.02 kgf/cm^2, 128 psi} (300 rpm)** — Minimum: **708 kPa {7.22 kgf/cm^2, 103 psi} (300 rpm)** — Maximum difference between cylinders: **150 kPa {1.53 kgf/cm^2, 21.8 psi}** **Note** • Because the SKYACTIV-G 2.0 retards the intake valve closing timing, compression pressure is low.	Yes	Go to the next step.
		No	Inspect the following: • Damaged valve seat • Worn valve stem and valve guide • Worn or stuck piston ring • Worn piston, piston ring or cylinder • Improper intake valve timing • Improper exhaust valve timing Service if necessary.
20	**INSPECT IGNITION SYSTEM OPERATION** **Note** • Because the malfunction may have been resolved by removing the carbon adhered to the spark plug during the spark inspection for the spark plug, verify that the repairs have been completed. • Perform the Spark Test. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.0].) • 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.
21	**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.

STEP	INSPECTION	RESULTS	ACTION
22	**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 2.0].) • Is there any malfunction?	Yes	Replace the PCV valve. (See POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)
		No	Injector driver malfunction. • Replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.0].) If the problem remains, overhaul the engine.
23	Verify the test results. • If normal, return to the diagnostic index to service any additional symptoms. (See SYMPTOM DIAGNOSTIC INDEX [SKYACTIV-G 2.0].) • If a malfunction remains, inspect the related Service Information and perform the repair or diagnosis. — If the vehicle is repaired, troubleshooting is completed. — If the vehicle is not repaired or additional diagnostic information is not available, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)		