DTC P0301:00, P0302:00, P0303:00, P0304:00 [SKYACTIV-G 2.0]

id0102h1703300

DTC P0301:00	**Cylinder No.1 misfire detected**
DTC P0302:00	**Cylinder No.2 misfire detected**
DTC P0303:00	**Cylinder No.3 misfire detected**
DTC P0304:00	**Cylinder No.4 misfire detected**
DETECTION CONDITION	• The PCM monitors the CKP sensor input signal interval time. The PCM calculates the change of interval time for each cylinder. If the change of interval time exceeds the preprogrammed criteria, the PCM detects a misfire in the corresponding cylinder. While the engine is running, the PCM counts the number of misfires that occurred at **200 crankshaft revolutions** or **1000 crankshaft revolutions** and calculates the misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, the PCM determines that a misfire, which can damage the catalytic converter or affect emission performance, has occurred. **Diagnostic support note** • This is a continuous monitor (misfire). • The check engine light illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • The check engine light flashes if the PCM detects the misfire which can damage the catalytic converter during first drive cycle. • PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA (Mode 2)/Snapshot data is available. • The DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Stops the fuel injection to the misfiring cylinder. • Limits the intake air amount.
POSSIBLE CAUSE	• Erratic signal to PCM — APP sensor signal malfunction — ECT sensor signal malfunction — IAT sensor No.1 signal malfunction — MAF sensor signal malfunction — CKP sensor signal malfunction — TP sensor signal malfunction — VSS signal malfunction — Related connector or terminals malfunction — Related wiring harness malfunction • Excessive air suction in intake air system (between dynamic chamber and cylinder head) • Fuel injector malfunction • Ignition system malfunction — Spark plug is wet or covered with carbon — Spark plug malfunction — Ignition coil malfunction — Ignition coil related wiring harness malfunction • Engine malfunction — Insufficient engine compression — Engine coolant leakage to combustion chamber • PCM malfunction
SYSTEM WIRING DIAGRAM	—

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 2)/ SNAPSHOT DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 2)/ snapshot data and DIAGNOSTIC MONITORING TEST RESULTS (misfire related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 2)/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step.

STEP	INSPECTION		ACTION
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND/OR DTC** • Switch the ignition to off, then to ON (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0].) • Are any other PENDING CODEs and/or DTCs present?	Yes	Go to the applicable PENDING CODE or DTC inspection. (See DTC TABLE [SKYACTIV-G 2.0].)
		No	Go to the next step.
4	**VERIFY CURRENT INPUT SIGNAL STATUS (KEY TO ON/IDLE)** • Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0].) — APP1 — APP2 — ECT — IAT — MAF — RPM — TP REL — VSS • Is there any signal that is far out of specification when the ignition is switched to ON and the engine idles? (See PCM INSPECTION [SKYACTIV-G 2.0].)	Yes	Inspect the suspected sensor and related wiring harness. Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
		No	Go to the next step.
5	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA (MODE 2) CONDITION** **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 same PIDs as in Step 4 while simulating under the FREEZE FRAME DATA (Mode 2) conditions. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0].) • Is there any signal which causes drastic changes?	Yes	Inspect the suspected sensor and related wiring harness. Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
		No	Go to the next step.
6	**INSPECT INTAKE AIR SYSTEM FOR AIR SUCTION** • Inspect for air leakage at the following: — Around connection of dynamic chamber and intake manifold — Around connection of intake manifold and cylinder head **Note** • Engine speed may change when rust penetrating agent is sprayed on the air suction area. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
		No	Go to the next step.

STEP	INSPECTION		ACTION
7	**INSPECT FUEL INJECTOR OPERATION** • Perform the Fuel Injector Operation Inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.0].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
		No	Go to the next step.
8	**INSPECT IGNITION SYSTEM OPERATION** • 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 Step 11.
		No	Go to the next step.
9	**INSPECT SPARK PLUG CONDITION** • Remove the spark plug for suspected cylinder. (See SPARK PLUG REMOVAL/INSTALLATION [SKYACTIV-G 2.0].) • Inspect the spark plug for suspected cylinder. (See SPARK PLUG INSPECTION [SKYACTIV-G 2.0].) • Is there any malfunction?	Yes	Replace the suspected spark plug, then go to Step 14. (See SPARK PLUG REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)
		No	Go to the next step.
10	**INSPECT IGNITION COIL** • Inspect the ignition coil for suspected cylinder. (See IGNITION COIL INSPECTION [SKYACTIV-G 2.0].) • Is there any malfunction?	Yes	Replace the suspected ignition coil, then go to Step 14. (See IGNITION COIL/ION SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)
		No	Inspect the ignition coil related wiring harness condition (intermittent open or short) for all cylinders. Repair or replace the suspected wiring harness, then go to Step 14.
11	**VERIFY DTC TROUBLESHOOTING COMPLETED** **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. • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See AFTER REPAIR PROCEDURE [SKYACTIV-G 2.0].) • Perform the Pending Trouble Code Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0].) • Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Go to Step 15.

STEP	INSPECTION		ACTION
12	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (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	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
13	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** • Perform the “ENGINE COOLANT LEAKAGE INSPECTION”. (See ENGINE COOLANT LEAKAGE INSPECTION [SKYACTIV-G 2.0].) • Does the radiator cap tester needle drop even though there is no engine coolant leakage from the radiator or the hoses?	Yes	Engine coolant leakage from the engine (between the combustion chamber and the engine coolant passage) may have occurred. • Verify the conditions of the gasket and the cylinder head. — If there is any malfunction: • Repair or replace the malfunctioning part according to the inspection results, then go to the next step.
		No	Go to the next step.
14	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See AFTER REPAIR PROCEDURE [SKYACTIV-G 2.0].) • Perform the Pending Trouble Code Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0].) • Is the PENDING CODE for this DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.0].) Go to the next step.
		No	Go to the next step.
15	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See AFTER REPAIR PROCEDURE [SKYACTIV-G 2.0].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [SKYACTIV-G 2.0].)
		No	DTC troubleshooting completed.