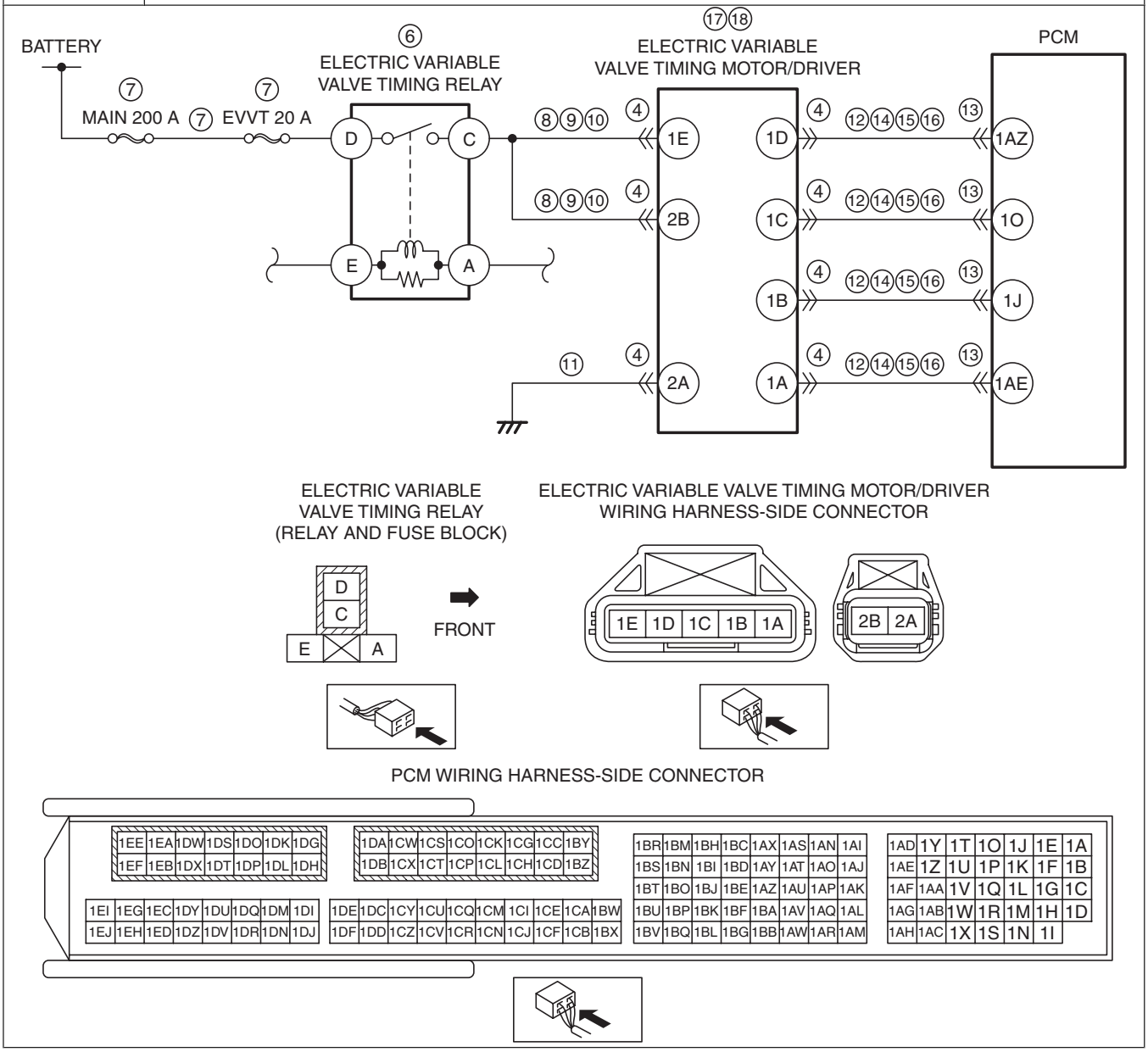
DTC P0010:00 [SKYACTIV-G 2.0]

id0102h1310700

DTC P0010:00	Electric variable valve timing control circuit range/performance problem
DETECTION CONDITION	• A malfunction is detected in the results of the on-board diagnostic test received from electric variable valve timing driver. • The motor speed signal received from the electric variable valve timing driver is in error. **Diagnostic support note** • This is a continuous monitor (CCM). • The check engine light illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2)/Snapshot data is available. • The DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Stops activation of the electric variable valve timing driver.
POSSIBLE CAUSE	• Electric variable valve timing motor/driver connectors or terminals malfunction • Electric variable valve timing relay malfunction • Short to ground or open circuit in electric variable valve timing relay power supply circuit — Short to ground in wiring harness between MAIN 200 A fuse and electric variable valve timing relay terminal D — MAIN 200 A fuse and/or EVVT 20 A fuse malfunction — Open circuit in wiring harness between battery positive terminal and electric variable valve timing relay terminal D • Short to ground in wiring harness between the following terminals: — Electric variable valve timing relay terminal C—Electric variable valve timing motor/driver terminal 1E — Electric variable valve timing relay terminal C—Electric variable valve timing motor/driver terminal 2B • Short to power supply in wiring harness between the following terminals: — Electric variable valve timing relay terminal C—Electric variable valve timing motor/driver terminal 1E — Electric variable valve timing relay terminal C—Electric variable valve timing motor/driver terminal 2B • Open circuit in wiring harness between the following terminals: — Electric variable valve timing relay terminal C—Electric variable valve timing motor/driver terminal 1E — Electric variable valve timing relay terminal C—Electric variable valve timing motor/driver terminal 2B • Open circuit in wiring harness between electric variable valve timing motor/driver terminal 2A and body ground • Short to ground in wiring harness between the following terminals: — Electric variable valve timing motor/driver terminal 1D—PCM terminal 1AZ — Electric variable valve timing motor/driver terminal 1C—PCM terminal 1O — Electric variable valve timing motor/driver terminal 1B—PCM terminal 1J — Electric variable valve timing motor/driver terminal 1A—PCM terminal 1AE • PCM connector or terminals malfunction • Short to power supply in wiring harness between the following terminals: — Electric variable valve timing motor/driver terminal 1D—PCM terminal 1AZ — Electric variable valve timing motor/driver terminal 1C—PCM terminal 1O — Electric variable valve timing motor/driver terminal 1B—PCM terminal 1J — Electric variable valve timing motor/driver terminal 1A—PCM terminal 1AE • Electric variable valve timing motor/driver circuits are shorted to each other • Open circuit in wiring harness between the following terminals: — Electric variable valve timing motor/driver terminal 1D—PCM terminal 1AZ — Electric variable valve timing motor/driver terminal 1C—PCM terminal 1O — Electric variable valve timing motor/driver terminal 1B—PCM terminal 1J — Electric variable valve timing motor/driver terminal 1A—PCM terminal 1AE • Electric variable valve timing driver malfunction • Electric variable valve timing motor malfunction • PCM malfunction

DTC P0010:00	Electric variable valve timing control circuit range/performance problem



Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 2)/ SNAPSHOT DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 2)/ snapshot data been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 2)/snapshot data on the repair order, then go to the next step.
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].) • Is the PENDING CODE/DTC P1380:00 also present?	Yes	Go to the applicable PENDING CODE or DTC inspection. (See DTC P1380:00 [SKYACTIV-G 2.0].)
		No	Go to the next step.

STEP	INSPECTION		ACTION
4	**INSPECT ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER CONNECTOR CONDITION** • Switch the ignition to off. • Disconnect the electric variable valve timing motor/driver 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 19.
		No	Go to the next step.
5	**DETERMINE IF MALFUNCTION CAUSE IS ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER POWER SUPPLY CIRCUIT OR OTHER** • Verify that the electric variable valve timing motor/driver connector is disconnected. • Start the engine. • Measure the voltage at the following terminals (wiring harness-side): — Electric variable valve timing motor/driver terminal 1E — Electric variable valve timing motor/driver terminal 2B • Is the voltage **B+**?	Yes	Go to Step 11.
		No	Go to the next step.
6	**INSPECT ELECTRIC VARIABLE VALVE TIMING RELAY** • Switch the ignition to off. • Remove the electric variable valve timing relay. • Inspect the electric variable valve timing relay. (See RELAY INSPECTION.) • Is there any malfunction?	Yes	Replace the electric variable valve timing relay, then go to Step 19.
		No	Go to the next step.
7	**INSPECT ELECTRIC VARIABLE VALVE TIMING RELAY POWER SUPPLY CIRCUIT FOR SHORT TO GROUND OR OPEN CIRCUIT** • Electric variable valve timing relay is removed. • Verify that the electric variable valve timing motor/driver connector is disconnected. • Measure the voltage at the electric variable valve timing relay terminal D (wiring harness-side). • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the MAIN 200 A fuse and EVVT 20 A fuse. • If the fuse is blown: — Repair or replace the wiring harness for a possible short to ground. — Replace the malfunctioning fuse. • If the fuse is deteriorated: — Replace the malfunctioning fuse. • If all fuses are normal: — Repair or replace the wiring harness for a possible open circuit. Go to Step 19.
8	**INSPECT ELECTRIC VARIABLE VALVE TIMING RELAY CONTROL CIRCUIT FOR SHORT TO GROUND** • Electric variable valve timing relay is removed. • Verify that the electric variable valve timing motor/driver connector is disconnected. • Inspect for continuity between electric variable valve timing relay terminal C (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 19.
		No	Go to the next step.
9	**INSPECT ELECTRIC VARIABLE VALVE TIMING RELAY CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY** • Electric variable valve timing relay is removed. • Verify that the electric variable valve timing motor/driver connector is disconnected. • Switch the ignition ON (engine off or on). • Measure the voltage at the electric variable valve timing relay terminal C (wiring harness-side). • Is the voltage **0 V**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible short to power supply, then go to Step 19.

STEP	INSPECTION		ACTION
10	**INSPECT ELECTRIC VARIABLE VALVE TIMING RELAY CONTROL CIRCUIT FOR OPEN CIRCUIT** • Electric variable valve timing relay is removed. • Verify that the electric variable valve timing motor/driver connector is disconnected. • Switch the ignition to off. • Inspect for continuity between the following terminals (wiring harness-side): — Electric variable valve timing relay terminal C —Electric variable valve timing motor/driver terminal 1E — Electric variable valve timing relay terminal C —Electric variable valve timing motor/driver terminal 2B • Is there continuity?	Yes	Go to Step 19.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 19.
11	**INSPECT ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER GROUND CIRCUIT FOR OPEN CIRCUIT** • Verify that the electric variable valve timing motor/driver connector is disconnected. • Switch the ignition to off. • Inspect for continuity between electric variable valve timing motor/driver terminal 2A (wiring harness-side) and body ground. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 19.
12	**INSPECT ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER CIRCUIT FOR SHORT TO GROUND** • Verify that the electric variable valve timing motor/driver connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — Electric variable valve timing motor/driver terminal 1D — Electric variable valve timing motor/driver terminal 1C — Electric variable valve timing motor/driver terminal 1B — Electric variable valve timing motor/driver terminal 1A • Is there continuity?	Yes	If the short to ground circuit could be detected in the wiring harness: • Repair or replace the wiring harness for a possible 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 2.0].) Go to Step 19.
		No	Go to the next step.
13	**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 19.
		No	Go to the next step.
14	**INSPECT ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER CIRCUIT FOR SHORT TO POWER SUPPLY** • Verify that the electric variable valve timing motor/driver and PCM connectors are disconnected. • Switch the ignition ON (engine off or on). • Measure the voltage at the following terminals (wiring harness-side): — Electric variable valve timing motor/driver terminal 1D — Electric variable valve timing motor/driver terminal 1C — Electric variable valve timing motor/driver terminal 1B — Electric variable valve timing motor/driver terminal 1A • Is the voltage **0 V**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible short to power supply, then go to Step 19.

STEP	INSPECTION		ACTION
15	**INSPECT ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER CIRCUITS FOR SHORT TO EACH OTHER** • Verify that the electric variable valve timing motor/driver and PCM connectors are disconnected. • Switch the ignition to off. • Inspect for continuity electric variable valve timing motor/driver terminals 1D, 1C, 1B and 1A (wiring harness-side). • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to each other, then go to Step 19.
		No	Go to the next step.
16	**INSPECT ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER CIRCUIT FOR OPEN CIRCUIT** • Verify that the electric variable valve timing motor/driver and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — Electric variable valve timing motor/driver terminal 1D—PCM terminal 1AZ — Electric variable valve timing motor/driver terminal 1C—PCM terminal 1O — Electric variable valve timing motor/driver terminal 1B—PCM terminal 1J — Electric variable valve timing motor/driver terminal 1A—PCM terminal 1AE • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 19.
17	**INSPECT ELECTRIC VARIABLE VALVE TIMING DRIVER** • Inspect the electric variable valve timing driver. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER INSPECTION [SKYACTIV-G 2.0].) • Is there any malfunction?	Yes	Replace the electric variable valve timing motor/driver, then go to Step 19. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)
		No	Go to the next step.
18	**INSPECT ELECTRIC VARIABLE VALVE TIMING MOTOR** • Inspect the electric variable valve timing motor. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER INSPECTION [SKYACTIV-G 2.0].) • Is there any malfunction?	Yes	Replace the electric variable valve timing motor/driver, then go to the next step. (See ELECTRIC VARIABLE VALVE TIMING MOTOR/DRIVER REMOVAL/INSTALLATION [SKYACTIV-G 2.0].)
		No	Go to the next step.
19	**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 KOER self test. (See KOEO/KOER SELF TEST [SKYACTIV-G 2.0].) • Is the same 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.
20	**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.