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1994 MAZDA Xedos 9 OEM Service and Repair Workshop Manual

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Item (definition)	Unit/Condition	Definition	Condition/Specification (Reference)
MAF	g/Sec	Mass air flow input from MAF sensor	• Displays MAF
	V	MAF sensor voltage	• Ignition switched ON (engine off) (MAF: 0.65 g/s {0.086 lb/min}): Approx. 0.72 V • Idle (after warm up) (MAF: 2.78 g/s {0.368 lb/min}): Approx. 0.86 V • Racing (engine speed is 2,000 rpm) (MAF: 7.74 g/s {1.02 lb/min}): Approx. 1.14 V

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION Note • Recording can be facilitated using the screen capture function of the PC. • Record the FREEZE FRAME DATA/snapshot data on the repair order.	–	Go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY • Verify related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	DETERMINE IF MAF SENSOR OR WIRING HARNESS MALFUNCTION • Access the MAF PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) • Verify the MAF PID value. • Is the MAF PID value 5 V or B+?	Yes	Go to Step 7.
		No	Go to the next step.
4	INSPECT MAF SENSOR/IAT SENSOR No.1 CONNECTOR CONDITION • Switch the ignition off. • Disconnect the MAF sensor/IAT sensor No.1 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 9.
		No	Go to the next step.
5	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 9.
		No	Go to the next step.
6	INSPECT MAF SENSOR • Inspect the MAF sensor. (See MASS AIR FLOW (MAF) SENSOR INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Replace the MAF sensor/IAT sensor No.1, then go to Step 9. (See MASS AIR FLOW (MAF) SENSOR/INTAKE AIR TEMPERATURE (IAT) SENSOR NO.1 REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
		No	Go to Step 9.

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)
MAP	KPa {MPA}, mBar {BAR}, psi, in H20	Manifold absolute pressure input from MAP sensor	• Displays MAP
MAP_V	V	MAP sensor voltage	• Ignition switched ON (engine off) (no load) (MAP: 102 kPa {1.04 kgf/cm ^{2}, 14.8 psi}): Approx. 1.75 V • Idle (after warm up) (no load) (MAP: 30 kPa {0.31 kgf/cm ^{2}, 4.4 psi}): Approx. 0.68 V • Racing (engine speed is 2,000 rpm) (no load) (MAP: 27 kPa {0.28 kgf/cm ^{2}, 3.9 psi}): Approx. 0.61 V

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION Note • Recording can be facilitated using the screen capture function of the PC. • Record the FREEZE FRAME DATA/snapshot data on the repair order.	–	Go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY • Verify related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	INSPECT MAP SENSOR/IAT SENSOR No.2 CONNECTOR CONDITION • Switch the ignition off. • Disconnect the MAP sensor/IAT sensor No.2 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 9.
		No	Go to the next step.
4	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 9.
		No	Go to the next step.

DTC P0111:00 [PCM (SKYACTIV-G 2.5T)]

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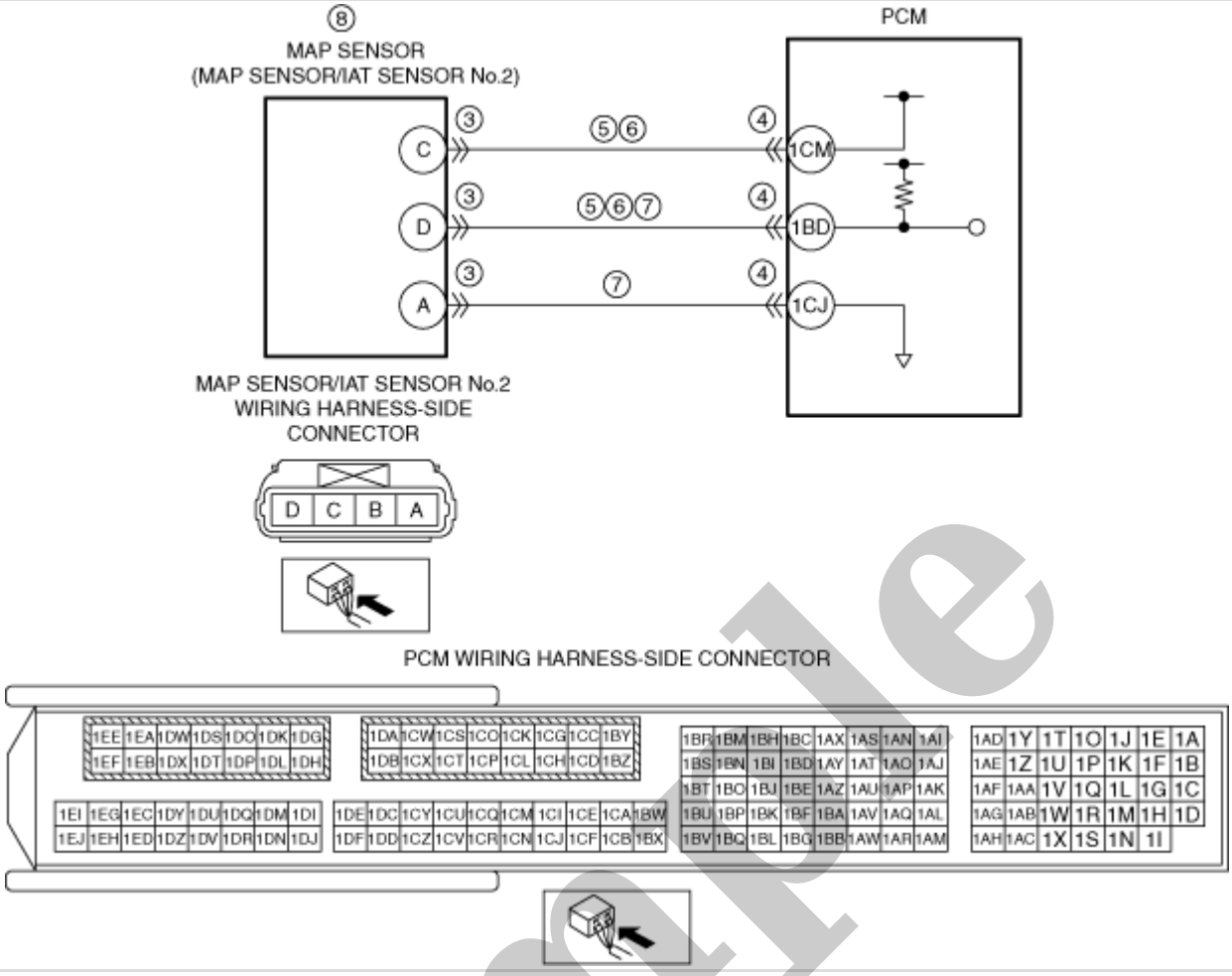
DTC P0111:00	IAT sensor No.1 circuit range/performance problem
DETECTION CONDITION	• The condition has continued for 2 s in which difference in intake air temperature measured by the IAT sensor No.2 or boost air temperature sensor and IAT sensor No.1 is 17 °C {31 °F} or more or -26 °C {-47 °F} or less. MONITORING CONDITIONS — Period vehicle being left: 6 h or more — Battery voltage: 8 V or more — Within 20 s after engine start — The following DTCs are not detected: • Boost air temperature sensor: P007C:00, P007D:00 • IAT sensor No.1: P0112:00, P0113:00 • IAT sensor No.2: P0097:00, P0098:00 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/Snapshot data is available. • DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Not applicable
POSSIBLE CAUSE	• MAF sensor/IAT sensor No.1 connector or terminals malfunction • IAT sensor No.1 malfunction • PCM connector or terminals malfunction • PCM malfunction
SYSTEM WIRING DIAGRAM	• Not applicable

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION Note • Recording can be facilitated using the screen capture function of the PC. • Record the FREEZE FRAME DATA/snapshot data on the repair order.	–	Go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY • Verify related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

DTC P0108:00	MAP sensor circuit high input



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)
MAP	KPa {MPA}, mBar {BAR}, psi, in H20	Manifold absolute pressure input from MAP sensor	• Displays MAP
MAP_V	V	MAP sensor voltage	• Ignition switched ON (engine off) (no load) (MAP: 102 kPa {1.04 kgf/cm ^{2}, 14.8 psi}): Approx. 1.75 V • Idle (after warm up) (no load) (MAP: 30 kPa {0.31 kgf/cm ^{2}, 4.4 psi}): Approx. 0.68 V • Racing (engine speed is 2,000 rpm) (no load) (MAP: 27 kPa {0.28 kgf/cm ^{2}, 3.9 psi}): Approx. 0.61 V

Diagnostic Procedure

DTC P0327:00 [PCM (SKYACTIV-G 2.5T)]

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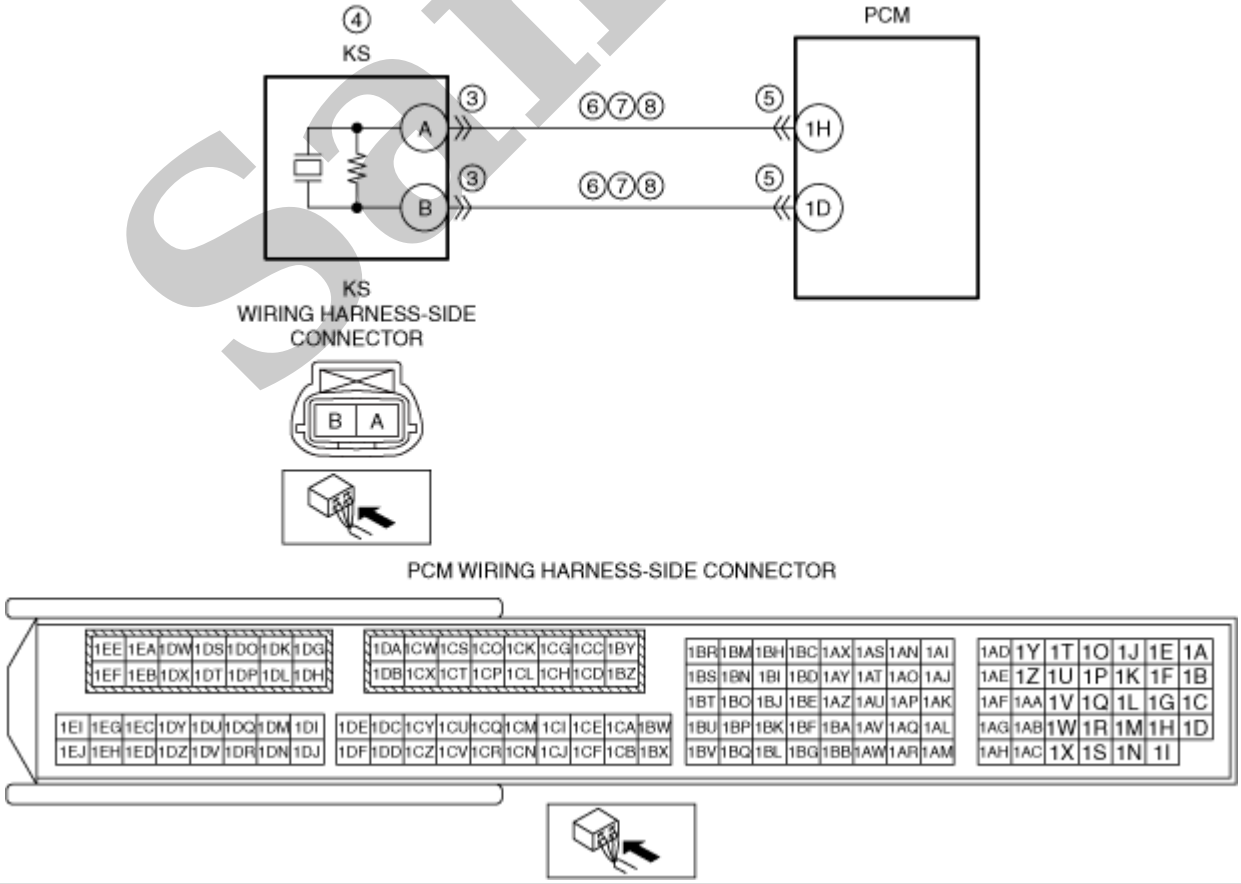
DTC P0327:00	KS circuit low input
DETECTION CONDITION	• The PCM monitors input signal from the KS. If the input voltage is low for 5 s, the PCM determines that the KS circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The check engine light illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA/Snapshot data is available. • DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Sets the knocking spark retard correction value of the ignition control to the fixed value.
POSSIBLE CAUSE	• KS connector or terminals malfunction • KS malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — KS terminal A—PCM terminal 1H — KS terminal B—PCM terminal 1D • KS circuits are shorted to each other • Open circuit in wiring harness between the following terminals: — KS terminal A—PCM terminal 1H — KS terminal B—PCM terminal 1D • PCM malfunction



DTC P0328:00 [PCM (SKYACTIV-G 2.5T)]

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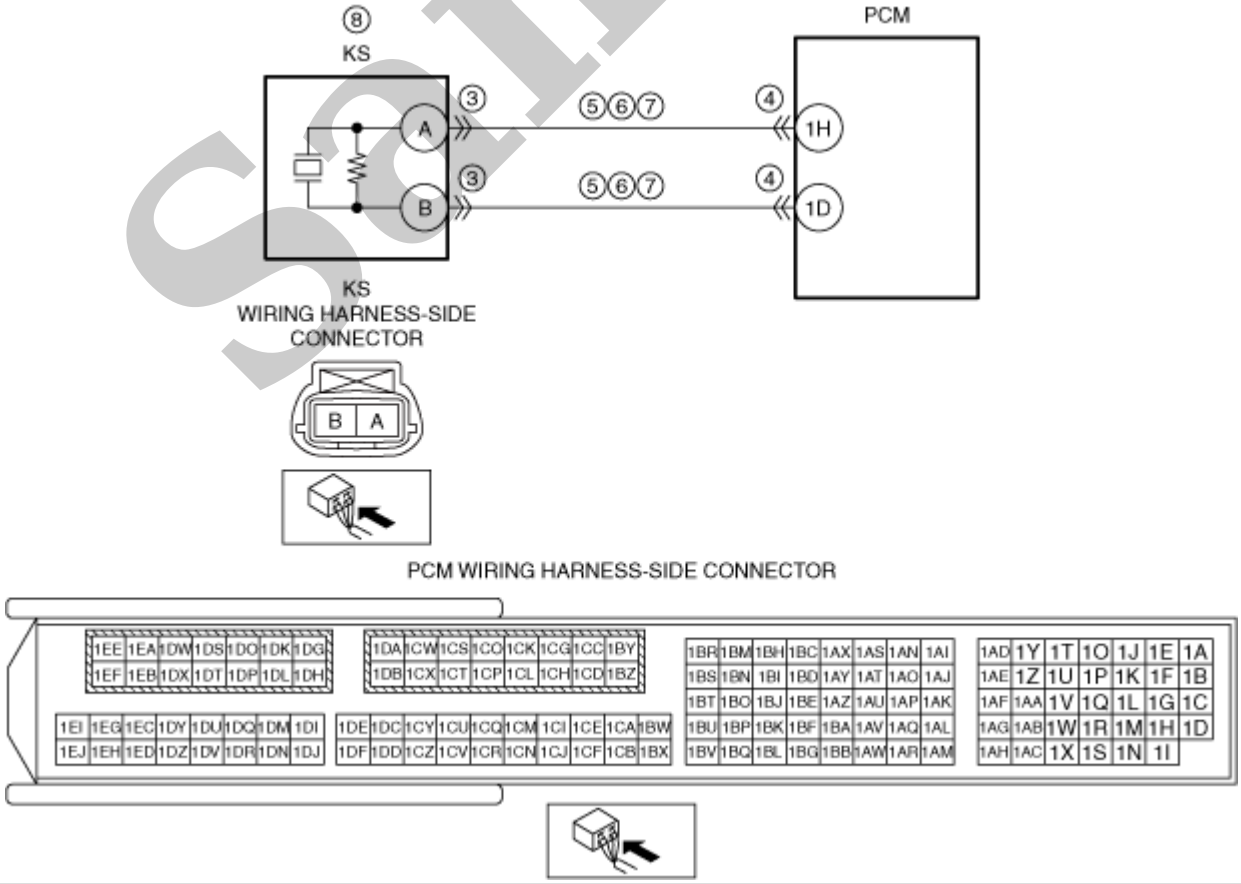
DTC P0328:00	**KS circuit high input**
DETECTION CONDITION	• The PCM monitors input signal from the KS. If the input voltage is high for 5 s, the PCM determines that the KS circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The check engine light illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA/Snapshot data is available. • DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Sets the knocking spark retard correction value of the ignition control to the fixed value.
POSSIBLE CAUSE	• KS connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between the following terminals: — KS terminal A—PCM terminal 1H — KS terminal B—PCM terminal 1D • KS circuits are shorted to each other • Open circuit in wiring harness between the following terminals: — KS terminal A—PCM terminal 1H — KS terminal B—PCM terminal 1D • KS malfunction • PCM malfunction



DTC P0300:00 [PCM (SKYACTIV-G 2.5T)]

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Note

• To determine the malfunctioning part, proceed with the diagnostics from "Function Inspection Using M-MDS".

Details On DTCs

DESCRIPTION	**Random misfire detected**	
DETECTION CONDITION	Determination conditions	• Any one of the following conditions is met: — The misfire rate for every 200 rotations of the crankshaft exceeds the specified value (misfire which may damage catalytic converter). — The misfire rate for every 1,000 rotations of the crankshaft exceeds the specified value (misfire going against emission regulations).
	Preconditions	• Battery voltage: 9–18 V *1 • Engine speed: 500–6,000 rpm (California)/ 500–4,500 rpm (except California) *1 • Engine coolant temperature: 20 °C {68 °F} or more *1 • Not cranking • Not stalling • Fuel-cut control not implemented • Crankshaft installation tolerance learning completed • Engine condition is stabilized (not directly after gear change) *1: Standard can be verified by displaying PIDs using the M-MDS
	Malfunction determination period	• 200 rotations of crankshaft (misfire which may damage catalytic converter) • 1,000 rotations of crankshaft (misfire going against emission regulations)
	Drive cycle	• 2
	Self test type	• CMDTC self test
	Sensor used	• CKP sensor • MAF sensor • MAP sensor
FAIL-SAFE FUNCTION	• Limits intake air amount • Implement fuel-cut control (if the catalytic converter may be damaged, perform fuel-cut on cylinder misfiring the most).	
VEHICLE STATUS WHEN DTCs ARE OUTPUT	• Misfiring which may damage catalytic converter (number of drive cycles: 1): — Check engine light flashes and pending code is recorded • Drive cycle directly after above drive cycle (number of drive cycles: 2): — Malfunction determined: check engine light is illuminated — Normal is determined: Pending code cleared • Rough idling, poor acceleration, stalling	

Item	Definition	Unit	Condition/Specification
MAP	Manifold absolute pressure input from MAP sensor	KPa {MPA}, mBar {BAR}, psi, in H20	• Displays MAP
MAP_V	MAP sensor voltage	V	• Ignition switched ON (engine off) (no load) (MAP: 102 kPa {1.04 kgf/cm ^{2}, 14.8 psi}): Approx. 1.75 V • Idle (after warm up) (no load) (MAP: 30 kPa {0.31 kgf/cm ^{2}, 4.4 psi}): Approx. 0.68 V • Racing (engine speed is 2,000 rpm) (no load) (MAP: 27 kPa {0.28 kgf/cm ^{2}, 3.9 psi}): Approx. 0.61 V
MF_CAT1	Number of misfires in No.1 cylinder leading to catalytic converter temperature increase (catalytic converter temperature increases due to fuel combustion around catalytic converter after misfire)	–	• Displays number of misfires corresponding to possible catalytic converter damage (No.1 cylinder)
MF_CAT_2	Number of misfires in No.2 cylinder leading to catalytic converter temperature increase (catalytic converter temperature increases due to fuel combustion around catalytic converter after misfire)	–	• Displays number of misfires corresponding to possible catalytic converter damage (No.2 cylinder)
MF_CAT_3	Number of misfires in No.3 cylinder leading to catalytic converter temperature increase (catalytic converter temperature increases due to fuel combustion around catalytic converter after misfire)	–	• Displays number of misfires corresponding to possible catalytic converter damage (No.3 cylinder)
MF_CAT_4	Number of misfires in No.4 cylinder leading to catalytic converter temperature increase (catalytic converter temperature increases due to fuel combustion around catalytic converter after misfire)	–	• Displays number of misfires corresponding to possible catalytic converter damage (No.4 cylinder)
MF_EMI1	Number of misfires in No.1 cylinder under conditions required by emission regulations	–	• Displays number of misfires possibly affecting emission (No.1 cylinder)
MF_EMI_2	Number of misfires in No.2 cylinder under conditions required by emission regulations	–	• Displays number of misfires possibly affecting emission (No.2 cylinder)
MF_EMI_3	Number of misfires in No.3 cylinder under conditions required by emission regulations	–	• Displays number of misfires possibly affecting emission (No.3 cylinder)
MF_EMI_4	Number of misfires in No.4 cylinder under conditions required by emission regulations	–	• Displays number of misfires possibly affecting emission (No.4 cylinder)
RPM	Engine speed	RPM	• Displays engine speed
TP_REL	Throttle valve opening angle (relative value) with value at throttle valve fully close timing as the start point	%	• Accelerator pedal released: Approx. 12% • Accelerator pedal fully depressed: Approx. 82%
VSS	Vehicle speed	KPH, MPH	• Displays vehicle speed

Function Inspection Using M-MDS

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: VERIFY RELATED REPAIR INFORMATION AVAILABILITY • Verify related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
8	**PURPOSE: VERIFY IF MISFIRE CAUSE IS BAD IGNITION COIL** • Switch the ignition coils on a cylinder that is misfiring and a cylinder that is not misfiring. (See IGNITION COIL/ION SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].) • Start the engine. • Verify all accessory loads (A/C, headlights, blower fan, rear window defogger) are off. • Under no-load conditions (P or N position), increase the engine speed to 3,000 rpm and hold for 30 s. • Verify the number of misfires. — Access the following PIDs using the M-MDS (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) (See PCM INSPECTION [SKYACTIV-G 2.5T].) • MF_CAT1 • MF_CAT_2 • MF_CAT_3 • MF_CAT_4 • MF_EMI1 • MF_EMI_2 • MF_EMI_3 • MF_EMI_4 • Is there a change from the recorded number of misfires in Step 6?	Yes	Go to the Troubleshooting Diagnostic Procedure to perform the procedure from Step 2.
		No	Go to the Troubleshooting Diagnostic Procedure to perform the procedure from Step 3.
9	**PURPOSE: RECORD NUMBER OF CURRENT MISFIRES WHILE DRIVING UNDER LOAD TO SPECIFY MISFIRING CYLINDER** • Start the engine. **Note** **• The fuel injection control enters the deceleration fuel cut zone when the accelerator pedal is fully released while the vehicle is being driven. At this time, the count for the number of misfires is stopped.** • Verify the number of misfires while the vehicle is being driven for 1 min under the condition of the freeze frame data recorded in Step 3. — Access the following PIDs using the M-MDS (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) (See PCM INSPECTION [SKYACTIV-G 2.5T].) • MF_CAT1 • MF_CAT_2 • MF_CAT_3 • MF_CAT_4 • MF_EMI1 • MF_EMI_2 • MF_EMI_3 • MF_EMI_4 • Can a misfire be verified?	Yes	Record each of the verified values, then go to the next step.
		No	Referring to the service questioning results, verify the misfire rate again with the driving mode data added before recording the freeze frame data/snapshot data.