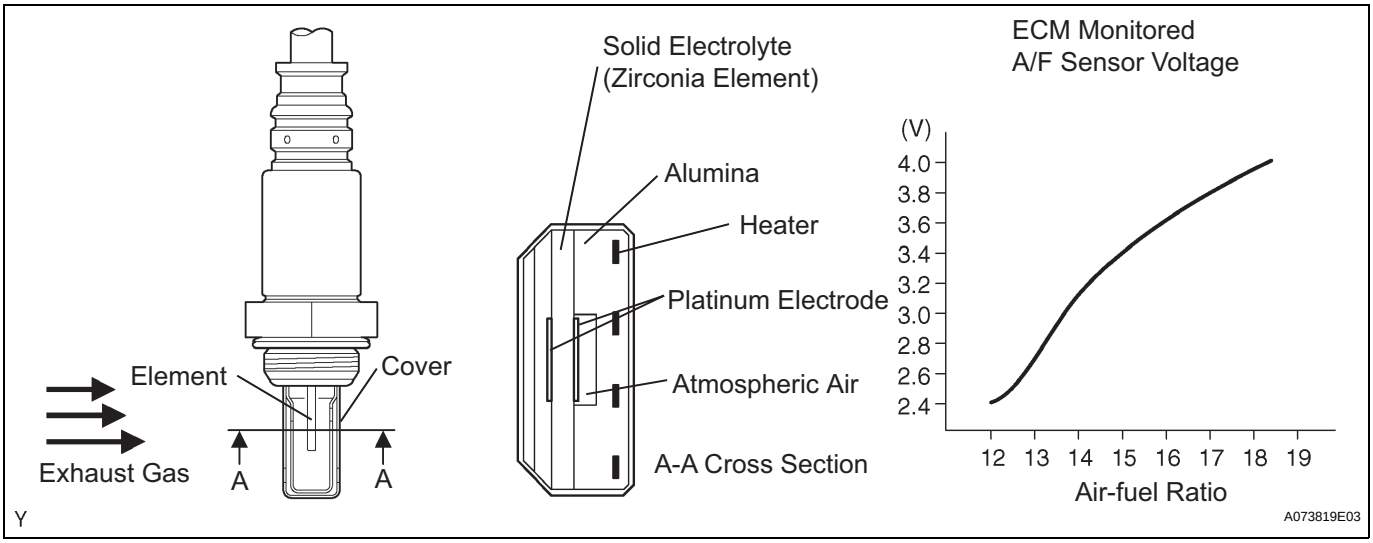
DTC	P2195	Oxygen (A/F) Sensor Signal Stuck Lean (Bank 1 Sensor 1)
DTC	P2196	Oxygen (A/F) Sensor Signal Stuck Rich (Bank 1 Sensor 1)
DTC	P2197	Oxygen (A/F) Sensor Signal Stuck Lean (Bank 2 Sensor 1)
DTC	P2198	Oxygen (A/F) Sensor Signal Stuck Rich (Bank 2 Sensor 1)

ES

HINT:
- Although the DTC titles say oxygen sensor, these DTCs relate to the Air-Fuel Ratio (A/F) sensor.
- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.

DESCRIPTION

The A/F sensor generates a voltage* that corresponds to the actual air-fuel ratio. This sensor voltage is used to provide the ECM with feedback so that it can control the air-fuel ratio. The ECM determines the deviation from the stoichiometric air-fuel ratio level, and regulates the fuel injection time. If the A/F sensor malfunctions, the ECM is unable to control the air-fuel ratio accurately.
The A/F sensor is the planar type and is integrated with the heater, which heats the solid electrolyte (zirconia element). This heater is controlled by the ECM. When the intake air volume is low (the exhaust gas temperature is low), a current flows into the heater to heat the sensor, in order to facilitate accurate oxygen concentration detection. In addition, the sensor and heater portions are narrower than the conventional type. The heat generated by the heater is conducted to the solid electrolyte though the alumina, therefore the sensor activation is accelerated.
In order to obtain a high purification rate of the carbon monoxide (CO), hydrocarbon (HC) and nitrogen oxide (NOx) components in the exhaust gas, a TWC is used. For the most efficient use of the TWC, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric level.
*: Value changes inside the ECM. Since the A/F sensor is the current output element, a current is converted to a voltage inside the ECM. Any measurements taken at the A/F sensor or ECM connectors will show a constant voltage.



DTC No.	DTC Detection Conditions	Trouble Areas
P2195 P2197	Conditions (a) and (b) continue for 2 seconds or more (2 trip detection logic): (a) Air-Fuel Ratio (A/F) sensor voltage is more than 3.8 V (b) Heated Oxygen (HO2) sensor voltage is 0.15 V or more	• Open or short in A/F sensor (bank 1, 2 sensor 1) circuit • A/F sensor (bank 1, 2 sensor 1) • A/F sensor (bank 1, 2 sensor 1) heater • A/F sensor heater relay • A/F sensor heater and relay circuits • Air induction system • Fuel pressure • Injector • ECM
P2195 P2197	While fuel-cut operation is performed (during vehicle deceleration), air-furl ratio (A/F) sensor current is 3.6 mA or more for 3 seconds	• A/F sensor • ECM
P2196 P2198	Conditions (a) and (b) continue for 2 seconds or more (2 trip detection logic): (a) A/F sensor voltage is less than 2.8 V (b) HO2 sensor voltage is less than 0.6 V	• Open or short in A/F sensor (bank 1, 2 sensor 1) circuit • A/F sensor (bank 1, 2 sensor 1) • A/F sensor (bank 1, 2 sensor 1) heater • A/F sensor heater relay • A/F sensor heater and relay circuits • Air induction system • Fuel pressure • Injector • ECM
P2196 P2198	While fuel-cut operation is performed (during vehicle deceleration), air-furl ratio (A/F) sensor current less than 1.4 mA for 3 seconds (2 trip detection logic)	• A/F sensor • ECM

HINT:
- DTCs P2195 and P2196 means malfunctions related to bank 1 A/F sensor circuit.
- DTCs P2197 and P2198 means malfunctions related to bank 2 A/F sensor circuit.
- Bank 1 refers to the bank that includes cylinder No. 1.
- Bank 2 refers to the bank that includes cylinder No. 2.
- When any of these DTCs are set, check the A/F sensor voltage output by selecting the following menu items on the intelligent tester: DIAGNOSIS / ENHANCED OBDII / DATA LIST / PRIMARY / AFS B1S1.
- Short-term fuel trim values can also be read using the intelligent tester.
- The ECM regulates the voltage at the A1A+, A2A+, A1A- and A2A- terminals of the ECM at a constant level. Therefore, the A/F sensor voltage output cannot be confirmed without using the intelligent tester.
- If a A/F sensor malfunction is detected, the ECM sets a DTC.

MONITOR DESCRIPTION

Sensor voltage detection monitor

Under the air-fuel ratio feedback control, if the A/F sensor voltage output indicates rich or lean for a certain period of time, the ECM determines that there is a malfunction in the A/F sensor. The ECM illuminates the MIL and sets a DTC.

Example:

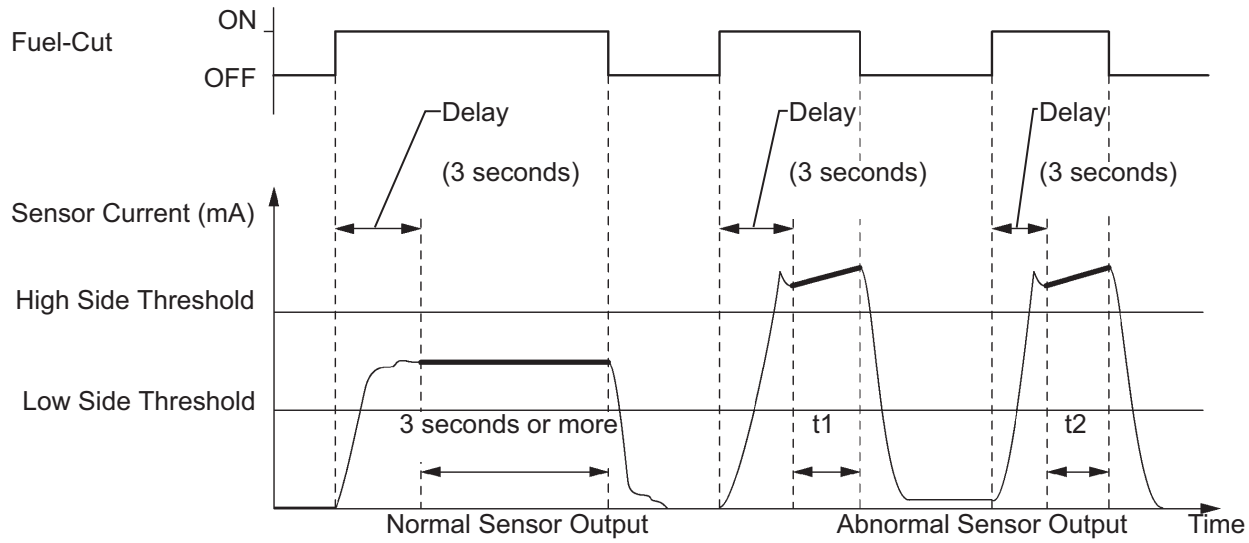
If the A/F sensor voltage output is less than 2.8 V (very rich condition) for 10 seconds, despite the HO2 sensor voltage output being less than 0.85 V, the ECM sets DTC P2196. Alternatively, if the A/F sensor voltage output is more than 3.8 V (very lean condition) for 10 seconds, despite the HO2 sensor voltage output being 0.15 V or more, DTC P2195 is set.

Sensor current detection monitor

A rich air-fuel mixture causes a low air-fuel ratio sensor current, and a lean air-fuel mixture causes a high air-fuel ratio sensor current. Therefore, the sensor output becomes high during acceleration, and the sensor becomes low during deceleration with the throttle valve fully closed. The ECM monitors the air-fuel ratio sensor current during fuel-cut and detects an unusual current value.

If the cumulative time the sensor output is 3.6mAor more (P2195: high-side stuck) or 1.4 mA or less (P2196: low-side stuck) exceeds more than 3 seconds, the ECM interprets a malfunction in the air-fuel ratio sensor and sets a DTC.

Air-fuel Ratio Sensor Current Monitor: Cumulative Time “t” = t1 + t2 = 3 seconds or more



MONITOR STRATEGY

Related DTCs	P2195: A/F sensor (Bank 1) signal stuck lean P2196: A/F sensor (Bank 1) signal stuck rich P2197: A/F sensor (Bank 2) signal stuck lean P2198: A/F sensor (Bank 2) signal stuck rich
Required Sensors / Components (Main)	A/F sensor
Required Sensors / Components (Related)	-
Frequency of Operation	Continuous
Duration	10 seconds: A/F sensor signal stuck lean/rich 3 seconds: A/F sensor current (high/low side)
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not present	P0031, P0032, P0051, P0052 (A/F Sensor heater Sensor 1), P0037, P0038, P0057, P0058 (O2 Sensor heater Sensor 2), P0100, P0101, P0102, P0103 (MAF Sensor), P0110, P0112, P0113 (IAT Sensor), P0115, P0116, P0117, P0118 (ECT Sensor), P0120, P0121, P0122, P0123, P0220, P0222, P0223 (TP Sensor), P0125 (Insufficient ECT for Closed Loop), P0136, P0156 (O2 Sensor 2), P0171, P0172 (Fuel System), P0300, P0301, P0302, P0303, P0304, P0305, P0306 (Misfire), P0335 (CKP Sensor), P0340 (CMP Sensor), P0450, P0451, P0452, P0453, P0455, P0456 (EVAP System), P0500 (VSS)

P2195, P2197 (A/F sensor signal stuck lean):

Duration while all of the following conditions met	2 seconds or more
Rear HO2S voltage	0.15 V or more
Time after engine start	30 seconds or more
A/F sensor status	Activated
Fuel system status	Closed-loop
Engine	Running

P2196, P2198 (A/F sensor signal stuck rich):

Duration while all of the following conditions met	2 seconds or more
Rear HO2S voltage	Less than 0.6 V
Time after engine start	30 seconds or more
A/F sensor status	Activated
Fuel system status	Closed-loop
Engine	Running

P2195, P2197 (A/F sensor signal (High side)):

Battery voltage	11 V or more
ECT	75°C (167°F) or more
Atmospheric pressure	570 mmHg or higher
A/F sensor status	Activated
Continuous time of fuel-cut	3 to 10 seconds.

P2196, P2198 (A/F sensor signal (Low side)):

Battery voltage	11 V or more
ECT	75°C (167°F) or more
Atmospheric pressure	570 mmHg or higher
A/F sensor status	Activated
Continuous time of fuel-cut	3 to 10 seconds.

TYPICAL MALFUNCTION THRESHOLDS

P2195, P2197 (A/F sensor signal stuck lean):

A/F sensor voltage	More than 3.8 V

P2196, P2198 (A/F sensor signal stuck rich):

A/F sensor voltage	Less than 2.8 V

P2195, P2197 (A/F sensor signal (High side)):

A/F sensor current	3.6 mA or more

P2196, P2198 (A/F sensor signal (Low side)):

A/F sensor current	Less than 1.57 mA

MONITOR RESULT

Refer to Checking Monitor Status for detailed information (See page ES-14).

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (See page ES-16).

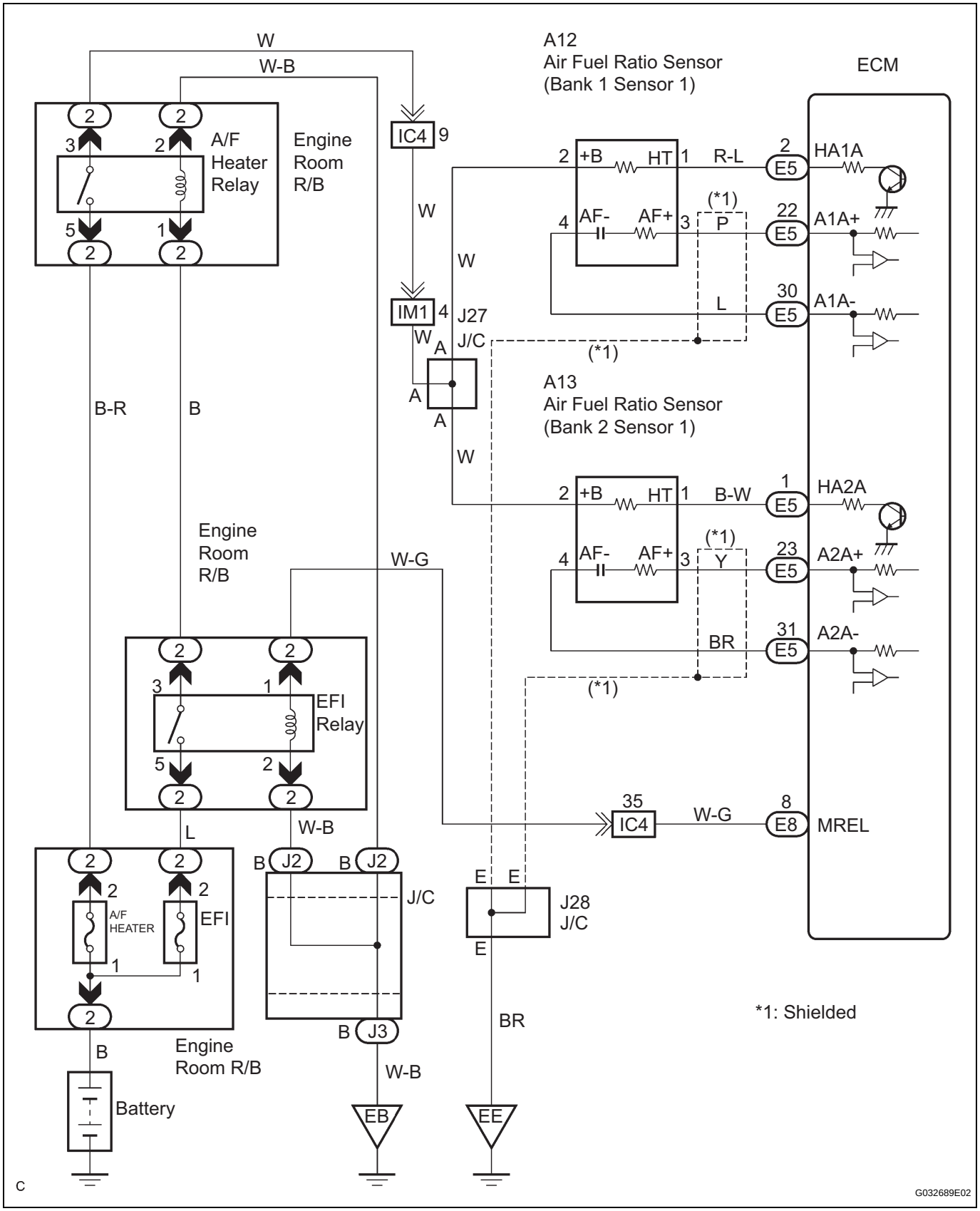
- TID (Test Identification Data) is assigned to each emissions-related component.
- TLT (Test Limit Type):
  If TLT is 0, the component is malfunctioning when the test value is higher than the test limit.
  If TLT is 1, the component is malfunctioning when the test value is lower than the test limit.
- CID (Component Identification Data) is assigned to each test value.
- Unit Conversion is used to calculate the test value indicated on generic OBD II scan tools.

TID $06: A/F sensor (Active A/F control method)

TLT	CID	Unit Conversion	Description of Test Data	Description of Test Limit
1	$01	Multiply by 0.0003 (V)	Cumulative A/F sensor locus length (Bank 1)	Lower malfunction criterion for A/F sensor
0	$01	Multiply by 0.0003 (V)	Cumulative A/F sensor locus length (Bank 1)	Upper malfunction criterion for A/F sensor
1	$11	Multiply by 0.0003 (V)	Cumulative A/F sensor locus length (Bank 2)	Lower malfunction criterion for A/F sensor

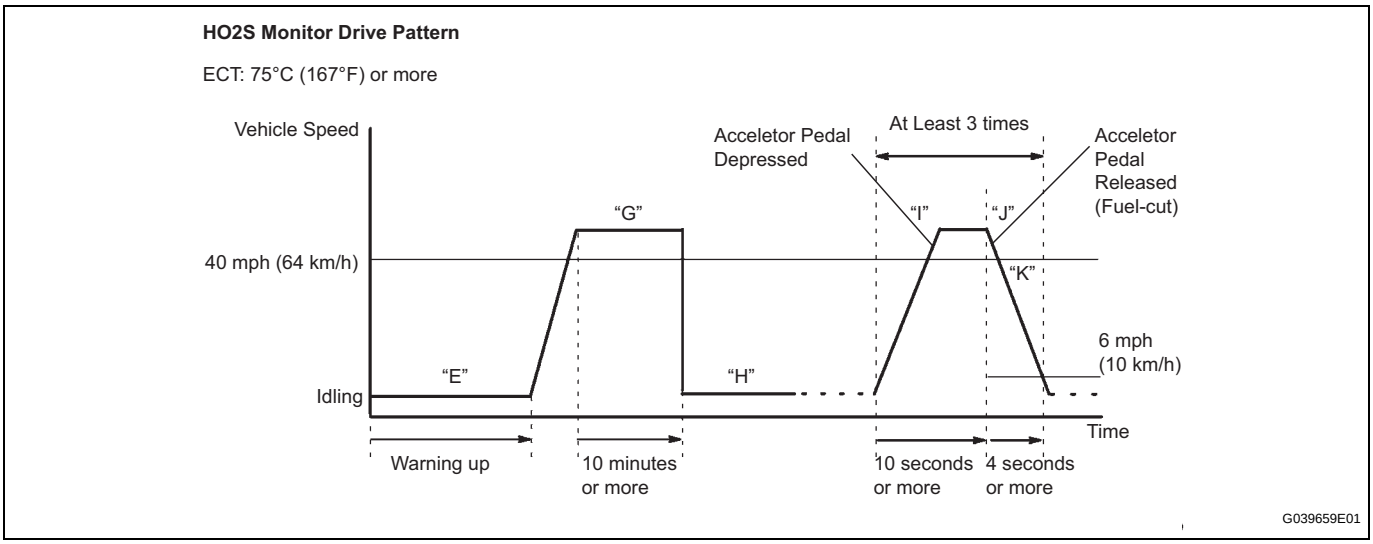
TLT	CID	Unit Conversion	Description of Test Data	Description of Test Limit
0	$11	Multiply by 0.0003 (V)	Cumulative A/F sensor locus length (Bank 2)	Upper malfunction criterion for A/F sensor
1	$02	Multiply by 0.000039 (A)	A/F sensor current (Bank 1)	Lower malfunction criterion for A/F sensor
0	$02	Multiply by 0.000039 (A)	A/F sensor current (Bank 1)	Upper malfunction criterion for A/F sensor
1	$12	Multiply by 0.000039 (A)	A/F sensor current (Bank 2)	Lower malfunction criterion for A/F sensor
0	$12	Multiply by 0.000039 (A)	A/F sensor current (Bank 2)	Upper malfunction criterion for A/F sensor

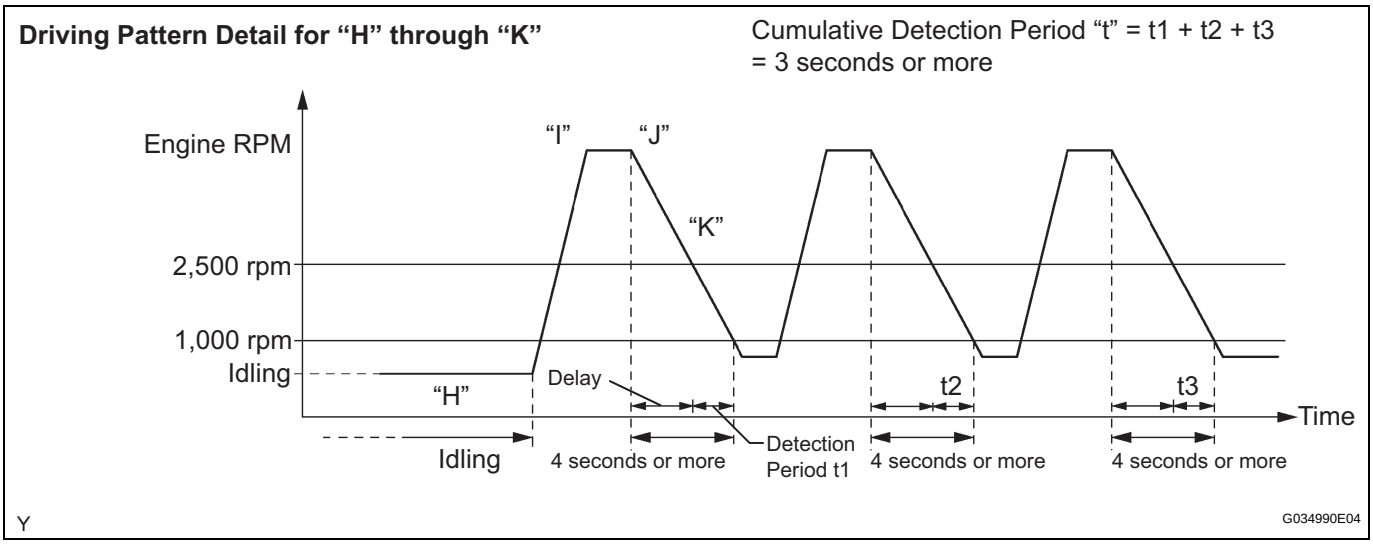
WIRING DIAGRAM



CONFIRMATION DRIVING PATTERN

This confirmation driving pattern is used in steps 4, 7, 17, and 21 of the following diagnostic troubleshooting procedure when using the intelligent tester.





1. Connect the intelligent tester to the DLC3 (Procedure "A").
2. Turn the ignition switch on (Procedure "B").
3. Turn the tester on (Procedure "C").
4. Clear DTCs (See page ES-30) (Procedure "D").
5. Start the engine, and warm it up until the ECT reaches 75°C (167°F) or higher (Procedure "E").
6. Select the following menu items on the tester to check the fuel-cut status: DIAGNOSIS / ENHANCED OBD II / DATA LIST / USER DATA / FC IDLE (Procedure "F").
7. Drive the vehicle at between 40 mph (64 km/h) or more for at least 10 minutes. (Procedure "G").
8. Change the transmission to 2nd gear (Procedure "H").
9. Drive the vehicle at proper vehicle speed to perform fuel-cut operation (refer to the following HINT) (Procedure "I").
   HINT:
   Fuel-cut is performed when the following conditions are met:
   - Accelerator pedal is fully released.
   - Engine speed is 2,500 rpm or more (fuel injection returns at 1,000 rpm).
10. Accelerate the vehicle to 30 mph (48 km/h) or more by depressing the accelerator pedal for at least 10 seconds (Procedure "J").
11. Soon after performing procedure "J" above, release the accelerator pedal for at least 4 seconds without depressing the brake pedal, in order to execute fuel-cut control (Procedure "K").
12. Allow the vehicle to decelerate until the vehicle speed declines to less than 6 mph (10 km/h) (Procedure "L").

13.Repeat procedures from "H" through "K" above at least 3 times in one driving cycle (Procedure "M").
HINT:
Completion of all A/F sensor monitors is required to change the value in TEST RESULT.
CAUTION:
Strictly observe of posted speed limits, traffic laws, and road conditions when performing these drive patterns.

INSPECTION PROCEDURE

HINT:
Malfunctioning areas can be identified by performing the A/F CONTROL function provided in the ACTIVE TEST. The A/F CONTROL function can help to determine whether the Air-Fuel Ratio (A/F) sensor, Heated Oxygen (HO2) sensor and other potential trouble areas are malfunctioning.
The following instructions describe how to conduct the A/F CONTROL operation using an intelligent tester.

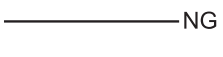
ES

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine and turn the tester on.
(c) Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
(d) Select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
(e) Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).
(f) Monitor the voltage outputs of the A/F and HO2 sensors (AFS B1S1 and O2S B1S2 or AFS B2S1 and O2S B2S2) displayed on the tester.
HINT:
- The A/F CONTROL operation lowers the fuel injection volume by 12.5% or increases the injection volume by 25%.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

Standard voltage

Tester Display (Sensor)	Injection Volumes	Status	Voltages
AFS B1S1 or AFS B2S1 (A/F)	+25%	Rich	Less than 3.0
AFS B1S1 or AFS B2S1 (A/F)	-12.5%	Lean	More than 3.35
O2S B1S2 or O2S B2S2 (HO2)	+25%	Rich	More than 0.55
O2S B1S2 or O2S B2S2 (HO2)	-12.5%	Lean	Less than 0.4

NOTICE:
The Air-Fuel Ratio (A/F) sensor has an output delay of a few seconds and the Heated Oxygen (HO2) sensor has a maximum output delay of approximately 20 seconds.

Case	A/F Sensor (Sensor 1) Output Voltage		HO2 Sensor (Sensor 2) Output Voltage		Main Suspected Trouble Area
1	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		-
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage More than 0.55 V Less than 0.4 V		
2	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• A/F sensor • A/F sensor heater • A/F sensor circuit
	Output Voltage Almost no reaction		Output Voltage More than 0.55 V Less than 0.4 V		

Case	A/F Sensor (Sensor 1) Output Voltage		HO2 Sensor (Sensor 2) Output Voltage		Main Suspected Trouble Area
3	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• HO2 sensor • HO2 sensor heater • HO2 sensor circuit
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage Almost no reaction		
4	Injection volume +25% -12.5%		Injection Volume +25% -12.5%		• Injector • Fuel pressure • Gas leakage from exhaust system (Air-fuel ratio extremely lean or rich)
	Output Voltage Almost no reaction		Output Voltage Almost no reaction		

ES

– Following the A/F CONTROL procedure enables technicians to check the graph of the voltage outputs of both the A/F and HO2 sensors.
– To display the graph, select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1S1 and O2S B1S2 or AFS B2S1 and O2S B2S2, and press the YES button and then the ENTER button. Then press the F4 button.
HINT:
  - Read freeze frame data using the intelligent tester. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air/fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.
  - A low A/F sensor voltage could be caused by a rich air-fuel mixture. Check for conditions that would cause the engine to run rich.
  - A high A/F sensor voltage could be caused by a lean air-fuel mixture. Check for conditions that would cause the engine to run lean.

1	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO P2195, P2196, P2197 OR P2198)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read DTCs.

Result

Display (DTC Output)	Proceed to
P2195, P2196, P2197 or P2198	A
P2195, P2196, P2197 or P2198 and other DTCs	B

HINT:
If any DTCs other than P2195, P2196, P2197 or P2198 are output, troubleshoot those DTCs first.

B → GO TO DTC CHART

A

2	READ VALUE OF INTELLIGENT TESTER (OUTPUT VOLTAGE OF A/F SENSOR)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine.
(c) Turn the tester on.
(d) Warm up the Air-Fuel Ratio (A/F) sensor at an engine speed of 2,500 rpm for 90 seconds.
(e) Select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / SNAPSHOT / MANUAL SNAPSHOT / USER DATA / AFS B1S1 or AFS B2S1 and ENGINE SPD.
(f) Check the A/F sensor voltage 3 times, when the engine is in each of the following conditions:
  (1) While idling (check for at least 30 seconds) (Step (1))
  (2) At an engine speed of approximately 2,500 rpm (without any sudden changes in engine speed) (Step (2))
  (3) Raise the engine speed to 4,000 rpm and then quickly release the accelerator pedal so that the throttle valve is fully closed (Step (3)).

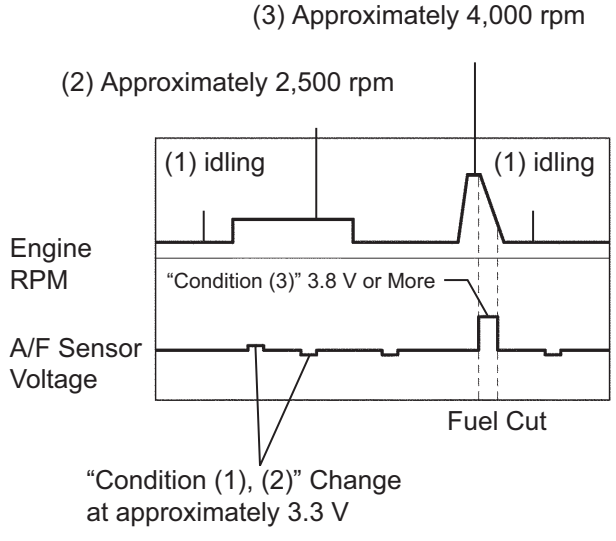
ES

Standard voltage

Conditions	A/F Sensor Voltage Variations	Reference
Steps (1) and (2)	Changes at approximately 3.3 V	3.1 to 3.5 V
Step (3)	Increases to 3.8 V or more	This occurs during engine deceleration (when fuel-cut performed)

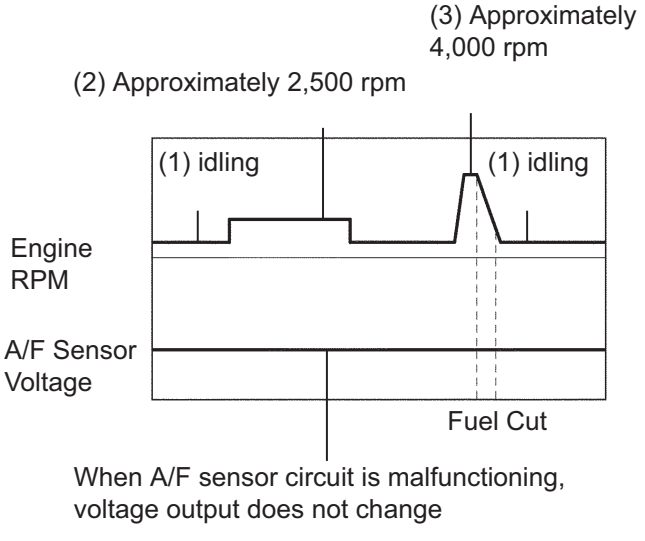
HINT:
For more information, see the diagrams below.

Normal Conditon:



( ): Step No.

Malfunction Conditon:



( ): Step No.

A072304E14

HINT:

- If the output voltage of the A/F sensor remains at approximately 3.3 V (see Malfunction Condition diagram) under any conditions, including those above, the A/F sensor may have an open circuit. (This will also happen if the A/F sensor heater has an open circuit.)
- If the output voltage of the A/F sensor remains at either approximately 3.8 V or more, or 2.8 V or less (see Malfunction Condition diagram) under any conditions, including those above, the A/F sensor may have a short circuit.
- The ECM stops fuel injection (fuel cut) during engine deceleration. This causes a lean condition and results in a momentary increase in the A/F sensor output voltage.
- The ECM must establish a closed throttle valve position learning value to perform fuel cut. If the battery terminal has been reconnected, the vehicle must be driven over 10 mph (16 km/h) to allow the ECM to learn the closed throttle valve position.
- When the vehicle is driven:
  The output voltage of the A/F sensor may be below 2.8 V during fuel enrichment. For the vehicle, this translates to a sudden increase in speed with the accelerator pedal fully depressed when trying to overtake another vehicle. The A/F sensor is functioning normally.
- The A/F sensor is a current output element; therefore, the current is converted into a voltage inside the ECM. Measuring the voltage at the connectors of the A/F sensor or ECM will show a constant voltage result.

NG → **Go to step 9**

OK

3	PERFORM CONFIRMATION DRIVING PATTERN

NEXT

4	CHECK WHETHER DTC OUTPUT RECURS (DTC P2195, P2196, P2197 OR P2198)

(a) Read DTCs using the intelligent tester.
(b) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

Result

Display (DTC Output)	Proceed to
P2195, P2196, P2197 or P2198	A
No output	B

B → Go to step 8

A

5 REPLACE AIR FUEL RATIO SENSOR

NEXT

6 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

7 CHECK WHETHER DTC OUTPUT RECURS (DTC P2195, P2196, P2197 OR P2198)

(a) Read DTCs using the intelligent tester.
(b) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

Result

Display (DTC Output)	Proceed to
No output	A
P2195, P2196, P2197 or P2198	B

B → REPLACE ECM

A

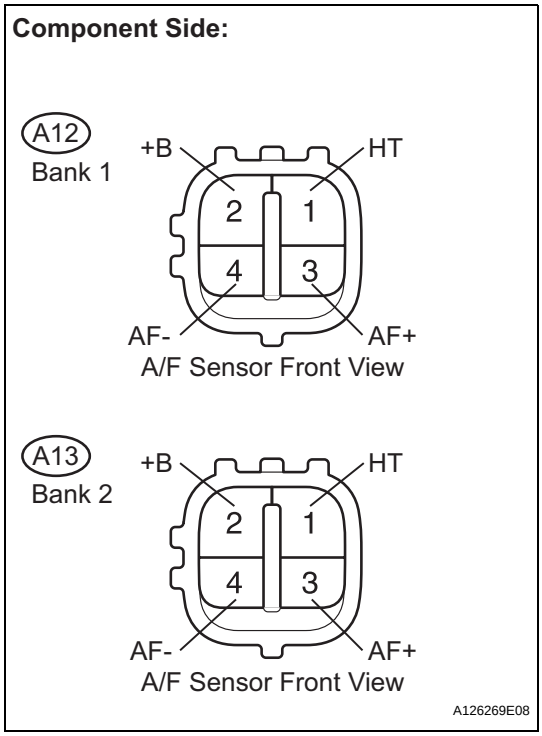
8 CONFIRM WHETHER VEHICLE HAS RUN OUT OF FUEL IN PAST

NO → CHECK FOR INTERMITTENT PROBLEMS AND PERFORM CONFIRMATION DIVING PATTERN

YES

DTC CAUSED BY RUNNING OUT OF FUEL

9	INSPECT AIR FUEL RATIO SENSOR



(a) Disconnect the A12 or A13 A/F sensor connector.
(b) Measure the resistance between the terminals of the A/F sensor connector.
Standard resistance:
Bank 1

Tester Connections	Specified Conditions
HT (1) - +B (2)	1.8 to 3.4 Ω at 20°C (68°F)
HT (1) - AF- (4)	10 kΩ or higher

Bank 2

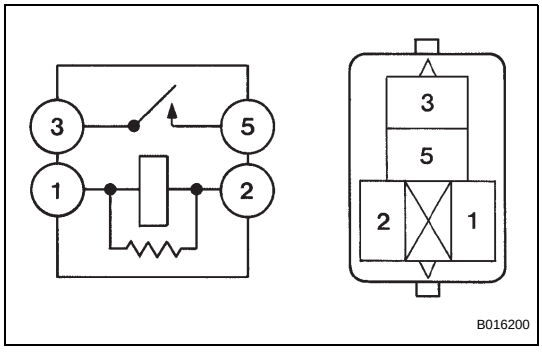
Tester Connections	Specified Conditions
HT (1) - +B (2)	1.8 to 3.4 Ω at 20°C (68°F)
HT (1) - AF- (4)	10 kΩ or higher

(c) Reconnect the A/F sensor connector.

NG → **REPLACE AIR FUEL RATIO SENSOR**

OK

10	INSPECT AIR FUEL RATIO SENSOR HEATER RELAY



(a) Remove the A/F sensor heater relay from the engine room R/B.
(b) Check the A/F sensor heater relay resistance.
Standard resistance

Tester Connections	Specified Conditions
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

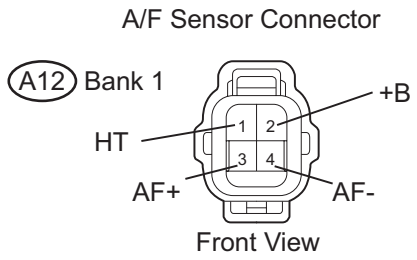
(c) Reinstall the A/F sensor heater relay.

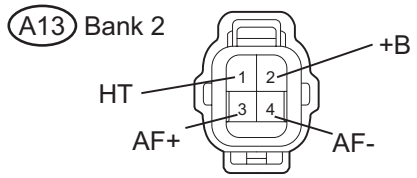
NG → **REPLACE AIR FUEL RATIO SENSOR HEATER RELAY**

OK

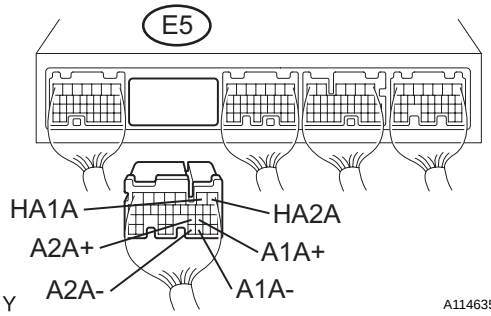
11 CHECK HARNESS AND CONNECTOR (A/F SENSOR - ECM)

Wire Harness Side:





ECM:



(a) Disconnect the A12 or A13 A/F sensor connector.
(b) Turn the ignition switch on.
(c) Measure the voltage between the +B terminal of the A/F sensor connector and body ground.

Standard voltage

Tester Connections	Specified Conditions
+B (A12-2) - Body ground	9 to 14 V
+B (A13-2) - Body ground	9 to 14 V

(d) Turn the ignition switch off.
(e) Disconnect the E5 ECM connector.
(f) Measure the resistance between the terminals of A/F sensor connector and ECM connector.

Standard resistance (Check for open)

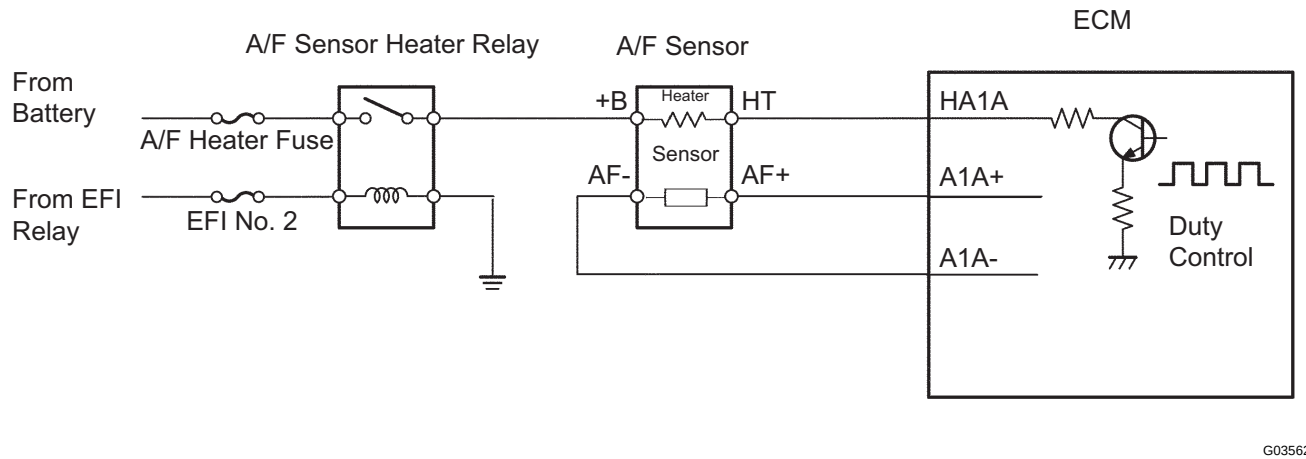
Tester Connections	Specified Conditions
HT (A12-1) - HA1A (E5-2)	Below 1 Ω
AF+ (A12-3) - A1A+ (E5-22)	Below 1 Ω
AF- (A12-4) - A1A- (E5-30)	Below 1 Ω
HT (A13-1) - HA2A (E5-1)	Below 1 Ω
AF+ (A13-3) - A2A+ (E5-23)	Below 1 Ω
AF- (A13-4) - A2A- (E5-31)	Below 1 Ω

Standard resistance (Check for short)

Tester Connections	Specified Conditions
HA1A (A12-1) or HA1A (E5-2) - Body ground	10 kΩ or higher
A1A+ (A12-3) or A1A+ (E5-22) - Body ground	10 kΩ or higher
A1A- (A12-4) or A1A- (E5-30) - Body ground	10 kΩ or higher
HA2A (A13-1) or HA2A (E5-1) - Body ground	10 kΩ or higher
A2A+ (A13-3) or A2A+ (E5-23) - Body ground	10 kΩ or higher
A2A- (A13-4) or A2A- (E5-31) - Body ground	10 kΩ or higher

(g) Reconnect the ECM connector.
(h) Reconnect the A/F sensor connector.

Reference (System Diagram of Bank 1 Sensor 1):



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

12 CHECK AIR INDUCTION SYSTEM

(a) Check the air induction system for vacuum leakage.
OK:
No leakage from air induction system.

NG → REPAIR OR REPLACE AIR INDUCTION SYSTEM

OK

13 CHECK FUEL PRESSURE

(a) Check the fuel pressure (See page FU-4).

NG → REPAIR OR REPLACE FUEL SYSTEM

OK

14 INSPECT FUEL INJECTOR ASSEMBLY

(a) Check the injector injection (whether fuel volume is high or low, and whether injection pattern is poor) (See page FU-11).

NG → REPLACE FUEL INJECTOR ASSEMBLY

OK

15 REPLACE AIR FUEL RATIO SENSOR

NEXT

16 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

17 CHECK WHETHER DTC OUTPUT RECURS (DTC P2195, P2196, P2197 OR P2198)

(a) Read DTCs using the intelligent tester.
(b) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRET CODES.

Result

Display (DTC Output)	Proceed to
No output	A

Display (DTC Output)	Proceed to
P2195, P2196, P2197 or P2198	B

B → REPLACE ECM AND PERFORM CONFIRMATION DRIVING PATTERN

A

18	CONFIRM WHETHER VEHICLE HAS RUN OUT OF FUEL IN PAST

NO → CHECK FOR INTERMITTENT PROBLEMS

YES

DTC CAUSED BY RUNNING OUT OF FUEL