P1235; HIGH PRESSURE FUEL PUM...

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Model Year: 2012	**Model:** IS250	**Prod Date Range:** [08/2011 -]
Title: 4GR-FSE ENGINE CONTROL SYSTEM: SFI SYSTEM: P1235; High Pressure Fuel Pump Circuit; 2012 MY IS250 [08/2011 -]		

DTC	P1235	High Pressure Fuel Pump Circuit

DESCRIPTION

The high pressure side fuel pump is attached to the insulator, which is attached to the cylinder head cover. The pump activates according to the position of the cam on the exhaust side camshaft (right bank).

The high pressure side fuel pump increases the pressure of the fuel supplied from the fuel pump in the fuel tank to 4 to 13 MPa (40.8 to 132.6 kgf/cm, 580 to 1886 psi) according to the operating condition, and it feeds the fuel to the fuel delivery pipe.

DTC No.	DTC Detection Condition	Trouble Area
P1235	Open or short in high pressure side fuel pump circuit for 1 second or more (1 trip detection logic)	• Open or short in fuel pump for high pressure • Fuel pump for high pressure • Injector driver (EDU) • ECM

MONITOR DESCRIPTION

The injector driver has the integrated circuit (IC) which monitors the electrical circuit between the spill control valve and injector driver. If an open circuit is detected, the IC sends the malfunction signal (FPD) to the ECM. Then, the ECM illuminates the MIL and sets a DTC immediately.

MONITOR STRATEGY

Related DTCs	P1235: Fuel pump for high pressure range check (low current)
Required Sensors / Components (Main)	Fuel pump
Required Sensors / Components (Sub)	Injector driver
Frequency of Operation	Continuous
Duration	1 second
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs are not present	None

Time after engine start	5 seconds or more
Injector driver relay	On
Output duty cycle	More than output duty cycle change map value*, and less than 95%
Battery voltage	10.5 V or more
Engine switch	On (IG)
Starter	Off
*: Output duty cycle change map value	-
Engine speed is 500 rpm	5%
Engine speed is 2000 rpm	20%
Engine speed is 4000 rpm	40%
Engine speed is 6000 rpm	60%
Engine speed is 8000 rpm	80%

TYPICAL MALFUNCTION THRESHOLDS

Fuel pump condition	No operation record

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the engine switch on (IG) and turn the Techstream on.
3. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure) INFO.
4. Turn the engine switch off and wait for at least 30 seconds.
5. Turn the engine switch on (IG) and turn the Techstream on.
6. Start the engine.
7. Idle the engine for 10 seconds [A].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read the pending DTC [B].

   HINT:

   - If a pending DTC is output, the system is malfunctioning.
   - If a pending DTC is not output, perform the following procedure.
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P1235.
12. Check the DTC judgment result.

Techstream Display	Description

Techstream Display	Description
NORMAL	◦ DTC judgment completed ◦ System normal
ABNORMAL	◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU's memory limit

HINT:

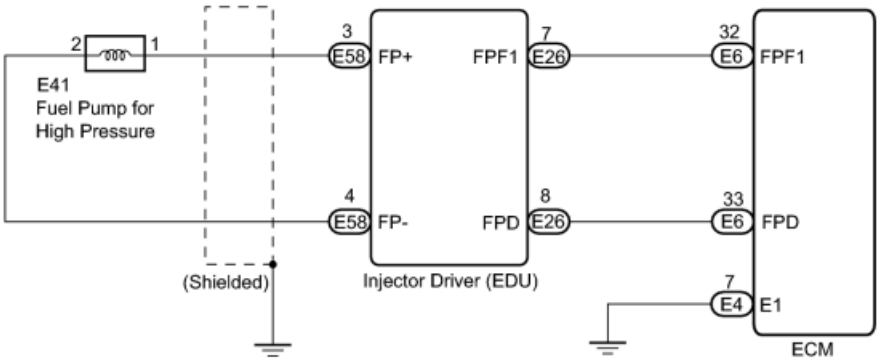
- If the judgment result shows ABNORMAL, the system has a malfunction.
- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows INCOMPLETE or N/A, perform steps [A] and [B] again.

13. If no DTC is output, perform a universal trip and check for permanent DTCs INFO.

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using Techstream. 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 INFO.

PROCEDURE

1.	INSPECT FUEL PUMP FOR HIGH PRESSURE

(a) Inspect the fuel pump for high pressure INFO.

NG ▶ REPLACE FUEL PUMP FOR HIGH PRESSURE

OK

2.	CHECK HARNESS AND CONNECTOR (INJECTOR DRIVER - FUEL PUMP FOR HIGH PRESSURE)

(a) Disconnect the E58 injector driver (EDU) connector.

(b) Disconnect the E41 fuel pump for high pressure connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for open):

Tester Connection	Condition	Specified Condition
E58-3 (FP+) - E41-1	Always	Below 1 Ω
E58-4 (FP-) - E41-2	Always	Below 1 Ω

Standard resistance (Check for short):

Tester Connection	Condition	Specified Condition
E58-3 (FP+) or E41-1 - Body ground	Always	10 kΩ or higher
E58-4 (FP-) or E41-2 - Body ground	Always	10 kΩ or higher

(d) Reconnect the injector driver (EDU) connector.

(e) Reconnect the fuel pump for high pressure connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.	CHECK HARNESS AND CONNECTOR (ECM - INJECTOR DRIVER)

(a) Disconnect the E6 ECM connector.

(b) Disconnect the E26 injector driver (EDU) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for open):

Tester Connection	Condition	Specified Condition
E6-32 (FPF1) - E26-7 (FPF1)	Always	Below 1 Ω
E6-33 (FPD) - E26-8 (FPD)	Always	Below 1 Ω

Standard resistance (Check for short):

Tester Connection	Condition	Specified Condition
E6-32 (FPF1) or E26-7 (FPF1) - Body ground	Always	10 kΩ or higher
E6-33 (FPD) or E26-8 (FPD) - Body ground	Always	10 kΩ or higher

(d) Reconnect the ECM connector.

(e) Reconnect the injector driver (EDU) connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▼

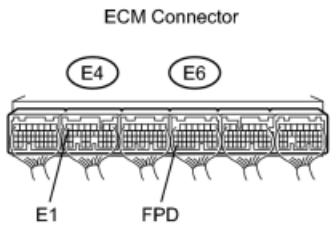
4.	INSPECT ECM (FPD VOLTAGE)

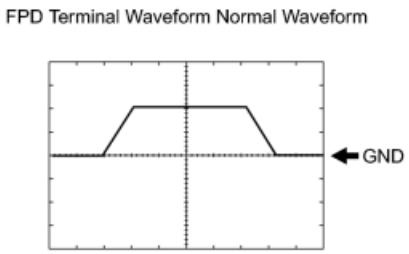
(a) Turn the engine switch on (IG).

(b) Inspect the ECM using an oscilloscope.

(1) While cranking the engine, check the waveform the terminals of the ECM connector.

ECM Terminal Name	E6-33 (FPD) - E4-7 (E1)
Tester Range	2 V/DIV., 5 ms./DIV.
Condition	Cranking





Standard:

Signal waveform appears as shown in the illustration.

HINT:

The FPD terminal waveform is output only right after the engine starts. If this DTC is stored when the engine is started from engine switch off, the system enters fail-safe mode and the waveform is not output.

NG ▶ GO TO STEP 6

OK ▼

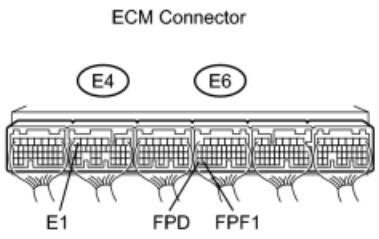
5.	INSPECT ECM (FPD AND FPF1 VOLTAGE)

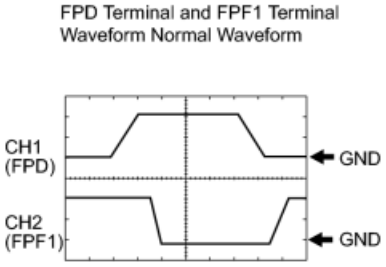
(a) Turn the engine switch on (IG).

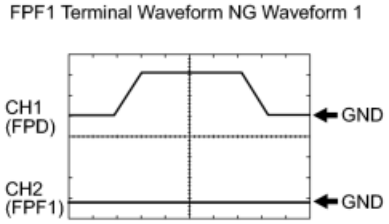
(b) Inspect the ECM using an oscilloscope.

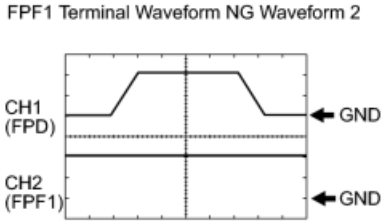
(1) While cranking the engine, check the waveform the terminals of the ECM connector.

ECM Terminal Name	CH1: E6-33 (FPD) - E4-7 (E1) CH2: E6-32 (FPF1) - E4-7 (E1)
Tester Range	2 V/DIV., 5 ms./DIV.
Condition	Cranking









HINT:

FPD terminal waveform is output only right after the engine starts.

FPD Terminal Waveform	**FPF1 Terminal Waveform**		**Proceed to**
OK	OK		A
OK	NG waveform 1*	Does not change from NG waveform 1 (FPF1 terminal waveform remains at GND even after disconnecting the injector driver (EDU) connector and cranking the engine)	A
		Changes to NG waveform 2 (FPF1 terminal waveform rises from GND after disconnecting the injector driver (EDU) connector and cranking the engine)	B
OK	NG waveform 2		B

HINT:

*: If the FPF1 terminal waveform is similar to the FRF1 terminal waveform NG waveform 1, stop the engine and disconnect E26 injector driver (EDU) connector. Then, while cranking the engine, check to see if there is a difference between the FPF1 terminal waveform and the previous one.

B REPLACE INJECTOR DRIVER

A REPLACE ECM

6.	INSPECT ECM (FPD VOLTAGE)

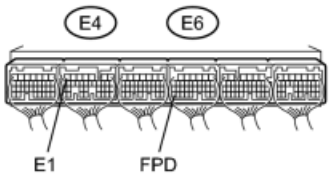
(a) Turn the engine switch on (IG).

(b) Disconnect the E26 injector driver (EDU) connector.

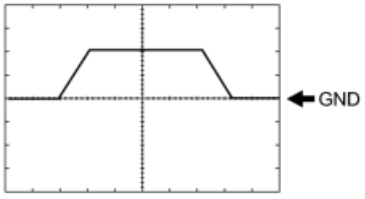
(1) While cranking the engine, check the waveform the terminals of the ECM connector.

ECM Terminal Name	E6-33 (FPD) - E4-7 (E1)
Tester Range	2 V/DIV., 5 ms./DIV.
Condition	Cranking

ECM Connector



FPD Terminal Waveform Normal Waveform



Standard:

Signal waveform appears as shown in the illustration.

HINT:

FPD terminal waveform is output only right after the engine starts.

NG REPLACE ECM

OK REPLACE INJECTOR DRIVER