

Repair Manual • 2AR-FE (Engine Control) • SFI System • P1604

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P1604 Startability Malfunction

DESCRIPTION

This DTC is stored when the engine does not start even though the STA signal is input or when the engine takes a long time to start, and when the engine speed is low or the engine stalls just after the engine starts.

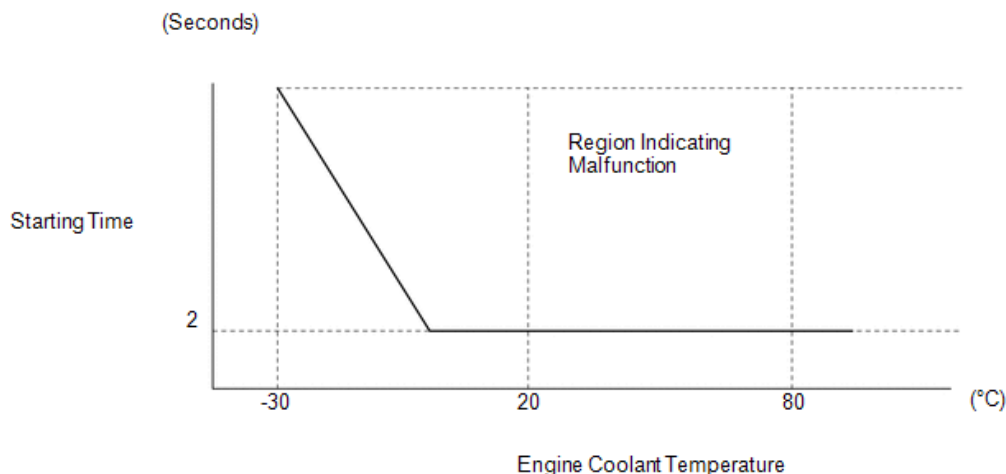
Using the Techstream, the conditions present when the DTC was stored can be confirmed by referring to the freeze frame data. Freeze frame data records engine conditions when a malfunction occurs. This information can be useful when troubleshooting.

It is necessary to check if the vehicle ran out of fuel before performing troubleshooting, as this DTC is also stored when there is engine starting trouble due to running out of fuel.

DTC No.	Detection Item	DTC Detection Condition	Trouble Area	MIL	Memory	Note
P1604	Startability Malfunction	<p>Either of the following conditions is met (1 trip detection logic):</p> <ul style="list-style-type: none"> The engine speed is below 500 rpm with the STA signal on for a certain amount of time (refer to the illustration below). After the engine starts (engine speed is 500 rpm or higher), the engine speed drops to 200 rpm or less within approximately 2 seconds. 	<ul style="list-style-type: none"> Engine assembly (excess friction, compression loss) Starter assembly Crankshaft position sensor Camshaft position sensor Engine coolant temperature sensor Fuel pump 	-	DTC stored	<p>DTC for Mexico Models</p> <p>- Applies</p>

DTC No.	Detection Item	DTC Detection Condition	Trouble Area	MIL	Memory	Note
			<ul style="list-style-type: none"> Fuel pump control system Fuel line (fuel filter, pipes and hoses) Fuel injector assembly Throttle with motor body assembly Fuel pressure regulator Battery Drive plate and ring gear sub-assembly Spark plug Ignition coil circuit Intake system Camshaft timing oil control valve assembly Mass air flow meter sub-assembly Air fuel ratio sensor Valve timing Fuel Purge VSV Intake valve Immobiliser system 			

DTC No.	Detection Item	DTC Detection Condition	Trouble Area	MIL	Memory	Note
			• ECM			



CAUTION / NOTICE / HINT

Hint:

- In contrast to normal malfunction diagnosis for components, circuits and systems, DTC P1604 is used to determine the malfunctioning area from the problem symptoms and freeze frame data when the user mentions problems such as starting difficulty.

As the DTC can be stored as a result of certain user actions, even if the DTC is output, if the customer makes no mention of problems, clear the DTC without performing any troubleshooting and return the vehicle to the customer.

- If any other DTCs are output, perform troubleshooting for those DTCs first.
- When the Data List item "Immobiliser Fuel Cut" is ON, the engine cannot be started.
- Read freeze frame data using the Techstream. Freeze frame data records engine conditions when a malfunction occurs. This information can be useful when troubleshooting.
- When confirming the freeze frame data, be sure to check all 5 sets of freeze frame data.

Click here [More Info](#)

- When confirming the freeze frame data, if there are multiple items related to the cause of the malfunction, perform troubleshooting for all related items.
- Try to start the vehicle under the conditions recorded in the freeze frame data which were present when the malfunction occurred. Confirm the data at this time and compare it with the freeze frame data.
- If the malfunction does not reoccur, carefully check the vehicle conditions from when the malfunction occurred using freeze frame data.
- When performing inspections, jiggle the relevant wire harnesses and connectors in an attempt to reproduce malfunctions that do not always occur.

- If the same inspection or replacement procedure appears 2 times when performing a procedure, it is not necessary to repeat the procedure the second time.

Malfunction Recurrence and Inspection Areas

- a. Freeze frame data exists, but the malfunction (starting difficulty) has not reoccurred and the malfunction conditions are unknown.

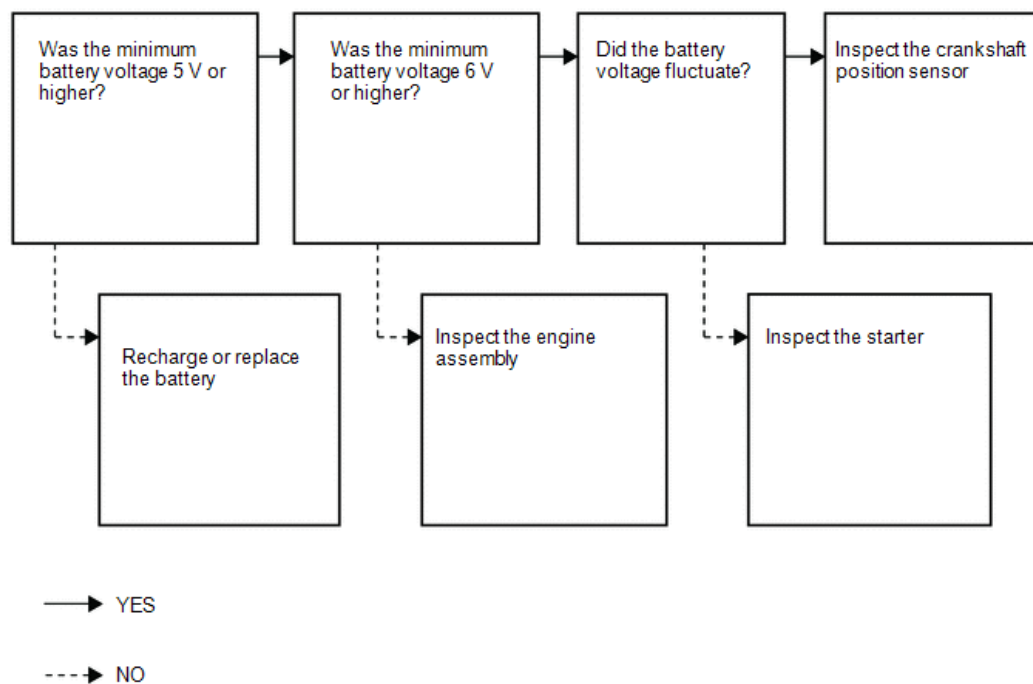
1. The engine speed recorded in the freeze frame data is 0 rpm (the engine does not crank).

Hint:

One of the following problems may be present: battery depletion, excess engine friction, a starter malfunction or a crankshaft position sensor malfunction.

- If the battery voltage is less than 6 V during cranking, there is a high probability that engine friction is abnormal.
- If the battery voltage drops to 5 V or less when starting the engine, the battery may be malfunctioning.
- If the battery voltage fluctuates while cranking the engine, it can be concluded that cranking is being performed. When the engine speed is 0 rpm, the crankshaft position sensor and/or an ECM may be malfunctioning.

When the engine speed for all 5 sets of freeze frame data is 0 rpm:



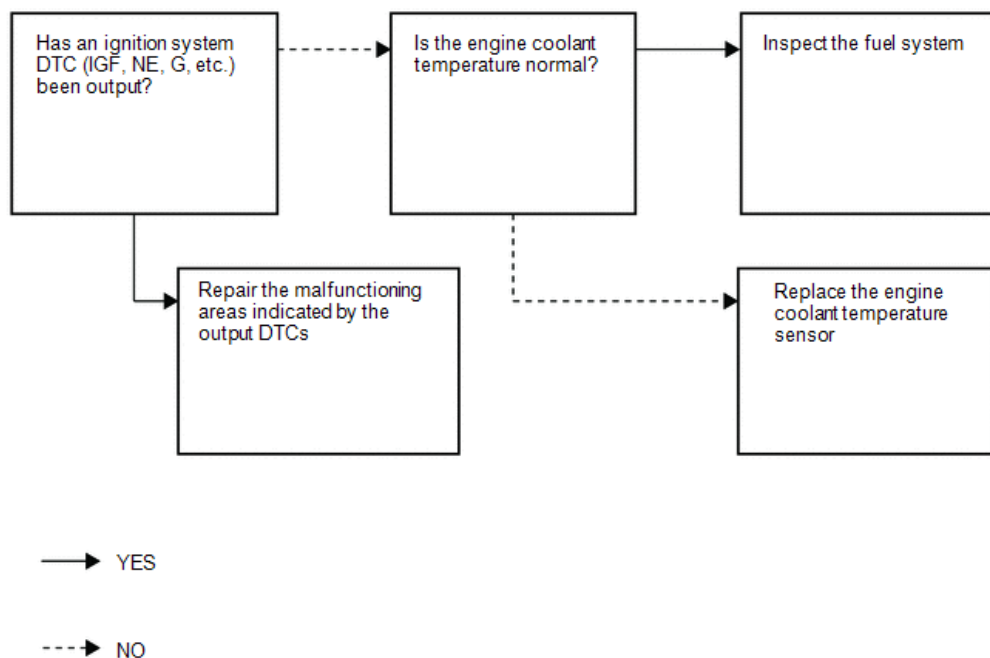
2. All engine speeds recorded in the freeze frame data are between 60 and 250 rpm (the engine cranks but there is no combustion).

Hint:

If the engine speed is between 60 and 250 rpm (no initial combustion), there may be a wiring problem or a complete failure of an ignition or fuel system part.

- Due to an engine coolant temperature sensor malfunction, the fuel injection volume is extremely high or low and the engine may not be able to be started.

Engine speed is between 60 and 250 rpm:



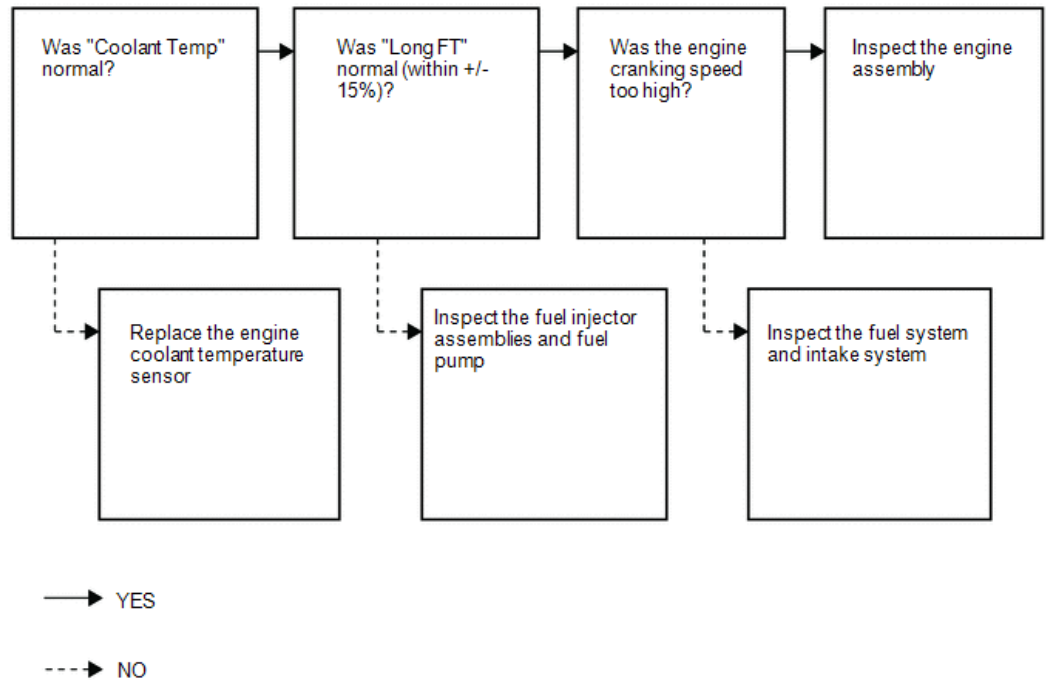
3. The engine speed recorded in the freeze frame data is 250 rpm or higher (the initial combustion and starter turnoff timing is too late).

Hint:

If the engine speed is 250 rpm or higher (combustion occurs but the initial combustion and starter turnoff timing is too late), the fuel injection volume is often incorrect (too low or too high) and determining the cause of the malfunction is often difficult.

- Due to an engine coolant temperature sensor malfunction, the fuel injection volume is extremely high or low and engine starting trouble may occur.
- If Long FT #1 is incorrect, there may be a fuel supply problem due to the injectors or fuel pump being clogged, etc.
- If the engine cranking speed is too high, compression loss may have occurred due to carbon interfering with the valve operation.

Engine speed is 250 rpm or higher:



b. When the malfunction (starting difficulty) can be reproduced, or malfunction conditions are known, perform the following inspections ("Problem symptoms" and "Systems to inspect")

1. Problem symptoms

1. The engine does not crank.

Hint:

The starter is normal if a noise that indicates the starter pinion gear is extending is heard. The battery may be fully depleted or there may be excess engine friction.

2. The engine cranking speed is abnormal.

Hint:

If the engine cranking speed is too high (for example, 300 rpm or higher with no combustion), compression loss may have occurred because carbon interfered with valve operation, etc.

3. There is no initial combustion.

Hint:

If there is no initial combustion, there is probably a wiring problem or an ignition or fuel system part malfunction.

4. The engine stalls after starter turn off.

Hint:

If the engine stalls after starter turn off, the air fuel ratio may be incorrect or the VVT may have a problem returning.

5. The initial combustion and starter turn off occur late.

Hint:

If the initial combustion and starter turn off occur late, the fuel injection volume is probably incorrect (too low or too high).

Hint:

Causes of fuel system malfunctions according to conditions present at the time of the malfunction.

- When 2 to 3 minutes have elapsed after stopping the engine: Fuel pressure loss due to the fuel pressure regulator failing to maintain the fuel pressure.
- When 15 to 120 minutes have elapsed after stopping the engine: Problem with injector fuel seal.
- When a long time has elapsed after stopping the engine: Fuel pressure regulator is stuck open.

2. Systems to inspect.

1. Intake system
2. Ignition system
3. Fuel system

INSPECTION FLOW

a. Freeze frame data exists, but the malfunction (starting difficulty) has not reoccurred and the malfunction conditions are unknown.

Freeze Frame Data Item	Result	Suspected Area	Procedure
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Freeze Frame Data Item	Result	Suspected Area	Procedure
Engine Speed	0 rpm (no engine cranking at all)	<ul style="list-style-type: none"> ◦ Battery fully depleted ◦ Engine assembly (excess friction) ◦ Starter assembly ◦ Immobiliser system ◦ Crankshaft position sensor ◦ ECM 	4 to 9
	60 to 250 rpm (engine cranks but no initial combustion*1)	<ul style="list-style-type: none"> ◦ Fuel pump control system ◦ Ignition system ◦ Engine coolant temperature sensor ◦ Fuel injection system 	10 to 14
	250 rpm or higher (combustion occurs but initial combustion and starter turn off*2 occur late)	<ul style="list-style-type: none"> ◦ Engine assembly (compression loss) ◦ Fuel injection system ◦ Fuel pump control system 	15 to 23

Hint:

- *1: First combustion after cranking begins.
- *2: Condition when engine speed increases and starter can be turned off.

b. When the malfunction (starting difficulty) can be reproduced, or when malfunction conditions are known.

1. Problem symptoms

Problem Symptom	Suspected Area	Suspected Component	Procedure
The engine does not crank	Battery malfunction	<ul style="list-style-type: none"> ■ Battery fully depleted 	26 to 31

Problem Symptom	Suspected Area	Suspected Component	Procedure
	Starting system	<ul style="list-style-type: none"> Starter assembly (includes pinion gear wear or tooth damage) Starting system 	
	Engine assembly	<ul style="list-style-type: none"> Engine assembly (excess friction) Drive plate and ring gear sub-assembly wear or tooth damage 	
Cranking speed too low	Battery malfunction	<ul style="list-style-type: none"> Battery fully depleted 	32 to 34
	Starting system	<ul style="list-style-type: none"> Starter assembly 	
	Engine assembly	<ul style="list-style-type: none"> Engine assembly (excess friction) 	
Cranking speed too high	Engine assembly	<ul style="list-style-type: none"> Engine assembly (compression loss) 	
There is no initial combustion	Fuel supply problem	<ul style="list-style-type: none"> Cannot maintain pressure due to fuel pressure regulator malfunction Fuel injector assembly leak Fuel leak from fuel line Fuel pump control system Fuel pump 	35 to 48
	Ignition system malfunction	<ul style="list-style-type: none"> Spark plug Crankshaft position sensor Ignition coil assembly 	
Engine stalls after starter turn off	Air suction	<ul style="list-style-type: none"> Intake system connections 	67 to 71, 92
	Deposits in throttle body	<ul style="list-style-type: none"> Throttle with motor body assembly 	
	VVT valve does not return properly	<ul style="list-style-type: none"> Camshaft timing oil control valve assembly 	

Problem Symptom	Suspected Area	Suspected Component	Procedure
	Mass air flow meter sub-assembly malfunction	<ul style="list-style-type: none"> Mass air flow meter sub-assembly 	
The initial combustion and starter turn off occur late	Engine coolant temperature sensor malfunction	<ul style="list-style-type: none"> Engine coolant temperature sensor 	49 to 61, 73
	Mass air flow meter sub-assembly malfunction	<ul style="list-style-type: none"> Mass air flow meter sub-assembly 	
	Abnormal A/F learning value	<ul style="list-style-type: none"> Air fuel ratio sensor 	
	Deviation from fuel injection characteristics	<ul style="list-style-type: none"> Fuel injector assembly 	
	Wet-fouled or dry-fouled spark plug	<ul style="list-style-type: none"> Spark plug 	
	Lack of fuel pressure	<ul style="list-style-type: none"> Fuel pressure regulator Fuel pump Fuel pump control system 	

2. Systems to inspect.

Troubleshooting by System	Suspected Area	Suspected Component	Procedure
Fuel system troubleshooting A	Abnormal air fuel ratio learning value	<ul style="list-style-type: none"> Fuel injector assembly 	86 to 91, 93, 94 95 to 102
	Rough idling	<ul style="list-style-type: none"> Crankshaft position sensor 	
	Abnormal fuel pressure	<ul style="list-style-type: none"> Fuel Fuel leak from fuel line Fuel pump Fuel pressure regulator 	
Fuel system troubleshooting B	Abnormal concentration of HC in surge tank	<ul style="list-style-type: none"> Purge VSV system Fuel injector assembly 	103 to 105

Troubleshooting by System	Suspected Area	Suspected Component	Procedure
Fuel system troubleshooting C	Injection signal system malfunction	<ul style="list-style-type: none"> Fuel injector assembly Crankshaft position sensor Camshaft position sensor ECM 	63 to 66, 72
Intake system troubleshooting	Difference between ISC target value and opening angle when idling	<ul style="list-style-type: none"> Engine assembly (compression loss) Valve timing Engine coolant temperature sensor ECM 	83 to 85 106 to 108
Ignition system troubleshooting	Camshaft and/or crankshaft position sensor signal malfunction	<ul style="list-style-type: none"> Crankshaft position sensor system (including sensor installation) Camshaft position sensor system (including sensor installation) ECM 	74 to 82 109 to 117

NOTICE:

- Inspect the fuses for circuits related to this system before performing the following procedure.
- After turning ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work.

Click here [More Info](#)

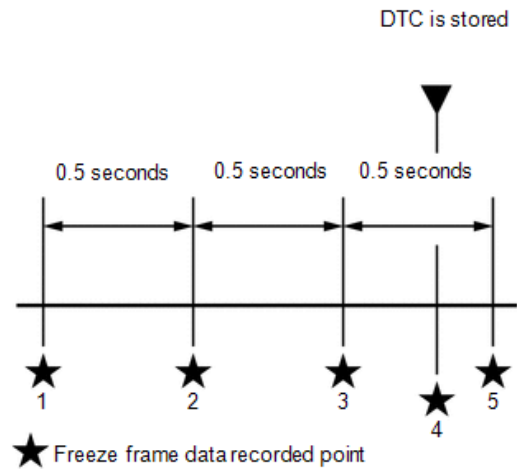
PROCEDURE

- CHECK ANY OTHER DTCS OUTPUT AND RECORD FREEZE FRAME DATA (IN ADDITION TO DTC P1604)
 - Connect the Techstream to the DLC3.
 - Turn the ignition switch to ON.
 - Turn the Techstream on.
 - Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.
 - Read the DTCs and record the Freeze Frame Data.

Powertrain > Engine and ECT > Trouble Codes

Hint:

- This freeze frame data shows the actual engine conditions when engine starting trouble occurred.
- When confirming the freeze frame data, be sure to check all 5 data sets of freeze frame data.
- The fourth set of freeze frame data is the data recorded when the DTC is stored.



T

Result

Result	Proceed to
DTC P1604 is output	A
DTC P1604 and other DTCs are output	B

B

▶

GO TO DTC CHART [More Info](#)

A

▼

2. CHECK IMMOBILISER SYSTEM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine and ECT / Data List / Primary / Immobiliser Fuel Cut.

Powertrain > Engine and ECT > Data List

Tester Display
Immobiliser Fuel Cut

- Read the value displayed on the Techstream.

OK

Immobiliser Fuel Cut is OFF

Hint:

- If the engine is started immediately after reconnecting the battery terminal, the engine may stall immediately after it starts due to the intercommunication process between each ECU. For this reason, when starting the engine after reconnecting the battery terminal, first turn the ignition switch to ON and then wait several seconds for the communication process to complete before starting the engine.
- When this operation causes DTC P1604 to be stored, this is due to normal operation of the immobiliser system and does not indicate a malfunction, so clear the DTC and return the vehicle to the customer.

Result

Result	Proceed to
OK	A
NG (w/ Smart Key System)	B
NG (w/o Smart Key System)	C

B	▶	REPAIR IMMOBILISER SYSTEM (W/SMART KEY SYSTEM) More Info
C	▶	REPAIR IMMOBILISER SYSTEM (W/O SMART KEY SYSTEM) More Info

A
▼

3. CHECK MALFUNCTION CONDITION

- Confirm the problem symptoms.

Result

Result	Proceed to
Freeze frame data exists, but the starting difficulty cannot be reproduced and it is unknown what kind of starting difficulty occurred	A
The problem symptoms can be reproduced, or the malfunction conditions are known	B

B	▶	GO TO STEP 25 GO TO STEP 25
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A
▼

4. READ FREEZE FRAME DATA

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.

- c. Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored.

Click here [More Info](#)

Result

Freeze Frame Data Item	Suspected Area	Proceed to	Battery Voltage
Engine Speed			
All 5 sets of freeze frame data are 0 rpm (no engine cranking at all)	Minimum voltage is less than 5 V	Battery fully depleted	A
	Minimum voltage is 5 V or higher	<ul style="list-style-type: none"> Starter assembly malfunction Crankshaft position sensor system Excess engine friction ECM 	B
60 to 250 rpm (engine cranks but no initial combustion)	-	<ul style="list-style-type: none"> Fuel pump control system Ignition system Engine coolant temperature sensor Fuel injection system 	C

Freeze Frame Data Item	Suspected Area	Proceed to	Battery Voltage
Engine Speed			
250 rpm or higher (combustion occurs but initial combustion and starter turnoff occur late)	-	<ul style="list-style-type: none"> Engine assembly Engine coolant temperature sensor Fuel injection system Fuel pump control system 	D

Result

Freeze Frame Data Item	Suspected Area	Proceed to
Low Rev for Eng Start		
ON exists	<ul style="list-style-type: none"> Intake system connections Throttle with motor body assembly Camshaft timing oil control valve assembly Mass air flow meter sub-assembly 	E

Hint:

When DTC P1604 is stored, either "Engine Start Hesitation"*1 or "Low Rev for Eng Start"*2 in the Freeze Frame Data will be ON. If "Low Rev for Eng Start" is ON, proceed to E.

*1: This value turns ON when the engine speed does not reach a certain value for a certain period of time when starting the engine.

*2: This value turns ON when the engine stalls immediately after starting the engine. If "Low Rev for Eng Start" is ON, as there is a possibility that the low engine speed or engine stall was caused by the user, confirm the following freeze frame data items.

- Immobiliser Fuel Cut
- Engine Speed (Starter Off)
- Shift SW Status (R, D Range)

A	▶	CHARGE OR REPLACE BATTERY
C	▶	GO TO STEP 10

D	▶	GO TO STEP 15
E	▶	GO TO STEP 67
B		
▼		

5. READ FREEZE FRAME DATA

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored.

Click here [More Info](#)

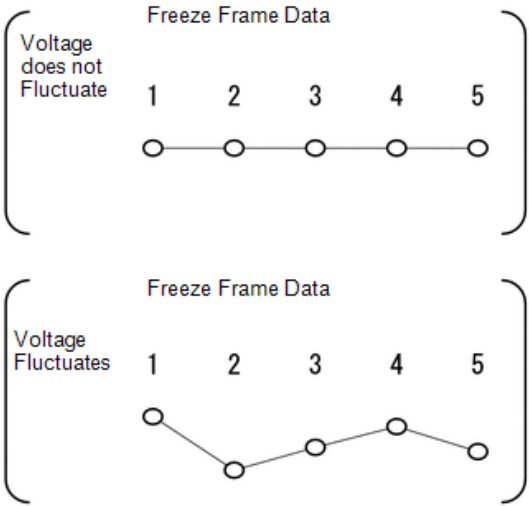
Result

Freeze Frame Data Item	Result	Suspected Area	Proceed to
Battery Voltage	Minimum voltage is 6 V or higher and voltage does not fluctuate*1	Starter system	A
	Minimum voltage is 6 V or higher and voltage fluctuates*2, *3	<ul style="list-style-type: none"> ■ Crankshaft position sensor system ■ ECM 	B
	Minimum voltage is 5 to 6 V*4	<ul style="list-style-type: none"> ■ Excess engine friction ■ Battery fully depleted 	C

Hint:

- *1: The 5 sets of freeze frame data show approximately the same battery voltage.
- *2: The 5 sets of freeze frame data show different battery voltages.
- *3: If the voltage fluctuates, it can be determined that cranking is being performed. When the engine speed is 0 rpm, the crankshaft position sensor system and/or the ECM may be malfunctioning.
- *4: There may be excess engine friction. Make sure that the crankshaft rotates smoothly when turning it by hand. Excess engine friction may have occurred temporarily. Remove the cylinder head cover and oil pan, and check for foreign matter such as iron fragments. If there is a malfunction or signs of a malfunction present, perform a detailed inspection by disassembling all the parts.
- Perform "Inspection After Repair" after replacing the engine assembly.

Click here [More Info](#)



A	▶	CHECK STARTER SIGNAL CIRCUIT More Info
C	▶	CHECK AND REPAIR ENGINE ASSEMBLY OR BATTERY

B

▼

6. CHECK SENSOR INSTALLATION (CRANKSHAFT POSITION SENSOR)
- a. Check the tightening and installation condition of the crankshaft position sensor bolt.

b. Check the connection of the crankshaft position sensor connector.

OK

Sensor is installed correctly.

Result

Proceed to
OK
NG

NG	▶	SECURELY REINSTALL SENSOR More Info
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OK

▼

7. INSPECT CRANKSHAFT POSITION SENSOR
- a. Disconnect the crankshaft position sensor connector.

b. Check for oil on the connector terminals.

OK

No oil on the terminals.

Result

Proceed to

OK

NG

NG ► REPLACE CRANKSHAFT POSITION SENSOR [More Info](#)

OK

**8. CHECK HARNESS AND CONNECTOR (CRANKSHAFT POSITION SENSOR - ECM)**

- a. Check the harnesses and connectors, referring to DTC P0335 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result**Proceed to**

OK

NG

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

**9. REPLACE CRANK POSITION SENSOR**

- a. Replace the crankshaft position sensor.

Click here [More Info](#)

- b. Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result**Proceed to**

OK

NG

OK	►	END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)
NG	►	REPLACE ECM More Info

10. READ FREEZE FRAME DATA

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored.

Click here [More Info](#)

Result

Freeze Frame Data Item	Suspected Area	Proceed to	Coolant Temp	Fuel Pump/Speed Status
Difference between Coolant Temp and Intake Air is 10°C (18°F) or higher*1	Coolant Temp is 125°C (257°F) or higher, or lower than outside temperature*3 by 15°C (27°F) or more	-	Engine coolant temperature sensor	A
	Other than above	All 5 sets of freeze frame data are ON	-	B
		At least 1 of the 5 sets of freeze frame data is OFF	Fuel pump control system	C
Difference between Coolant Temp and Intake Air is less than 10°C (18°F) *2	-	At least 1 of the 5 sets of freeze frame data is OFF	Fuel pump control system	
		All 5 sets of freeze frame data are ON	-	B

Hint:

- *1: A long time had not elapsed after stopping the engine.
- *2: A long time had elapsed after stopping the engine.
- *3: Use an actual outside temperature estimated from the Initial Intake Air Temp, Ambient Temp for A/C, and (if possible) the weather when the DTC was detected.
- Perform "Inspection After Repair" after replacing the engine coolant temperature sensor.

Click here [More Info](#)

A	▶	REPLACE ENGINE COOLANT TEMPERATURE SENSOR More Info
C	▶	CHECK FUEL PUMP CONTROL CIRCUIT More Info

B
▼

11. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Engine and ECT / Active Test / Control the Fuel Pump / Speed.

- w/ Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- w/o Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- e. When performing the Active Test, check for an operating sound from the fuel pump.

OK

Control the Fuel Pump / Speed	Specified Condition
ON	Operating sound heard
OFF	Operating sound not heard

Hint:

Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.

Result

Proceed to
OK

Proceed to
NG

NG

CHECK FUEL PUMP CONTROL CIRCUIT [More Info](#)

OK

**12. CHECK TERMINAL VOLTAGE (FUEL INJECTOR CIRCUIT)**

- a. Check the harnesses and connectors, referring to DTC P0300 procedure.

Click here [More Info](#)**Hint:**

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result

Proceed to
OK
NG

NG

CHECK FUEL INJECTOR CIRCUIT [More Info](#)

OK

**13. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)**

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Engine and ECT / Active Test / Control the Fuel Pump / Speed.

- w/ Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- w/o Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display**Control the Fuel Pump / Speed**

- e. When performing the Active Test, check for fuel leakage from the fuel pipes.

Result

Result	Proceed to
Fuel leakage or signs of fuel leakage are present	A
No fuel leakage or signs of fuel leakage	B

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- When performing the Active Test, if there is no operating noise from the fuel pump, the fuel pump system may be malfunctioning.
- Check if the vehicle ran out of fuel, as engine starting trouble due to running out of fuel is also detected.

A ► REPAIR OR REPLACE FUEL LINE

B
▼

14. CHECK FUEL SYSTEM

Click here [More Info](#)

Result

Result	Proceed to
There is foreign matter or signs that fuel pump was stuck	A
There is no foreign matter and no signs that fuel pump was stuck	B

A ► REPAIR OR REPLACE FUEL SYSTEM
B ► [GO TO STEP 24](#)

15. READ FREEZE FRAME DATA

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored.

Click here [More Info](#)

Result

Freeze Frame Data Item	Suspected Area	Proceed to			
Coolant Temp, Intake Air			Coolant Temp	Long FT #1	Engine Speed
Difference between Coolant Temp and Intake Air is 10°C (18°F) or higher	Coolant Temp is 125°C (257°F) or higher, or lower than outside temperature*2 by 15°C (27°F) or more	-	-	Engine coolant temperature sensor	A
	Other than above	-15% or less, or +15% or higher	-	<ul style="list-style-type: none"> Fuel pump control system Fuel injector assembly 	B
		-15 to +15%	Minimum speed is 300 rpm or higher*1	Engine assembly	C
			Minimum speed is below 300 rpm	<ul style="list-style-type: none"> Fuel system Intake air system 	D
Difference between Coolant Temp and Intake Air is less than 10°C (18°F)	-	-15% or less, or +15% or higher	-	<ul style="list-style-type: none"> Fuel pump control system Fuel injector assembly 	B
		-15 to +15%	Minimum speed is 300 rpm or higher*1	Engine assembly	C
			Minimum speed is below 300 rpm	<ul style="list-style-type: none"> Fuel system Intake air system 	D

Hint:

- *1: Compression loss may have occurred in the engine assembly.
- *2: Use an actual outside temperature estimated from the Initial Intake Air Temp, Ambient Temp for A/C, and (if possible) the weather when the DTC was detected.
- Perform "Inspection After Repair" after replacing the engine assembly or engine coolant temperature sensor.

Click here [More Info](#)

A	▶	REPLACE ENGINE COOLANT TEMPERATURE SENSOR More Info
C	▶	CHECK AND REPAIR ENGINE ASSEMBLY
D	▶	GO TO STEP 18

B

▼

16. INSPECT FUEL INJECTOR ASSEMBLY

- a. Check that no carbon is stuck to the fuel injector assembly.

OK

No carbon present.

Hint:

Perform "Inspection After Repair" after replacing the fuel injector assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG	▶	REPLACE FUEL INJECTOR ASSEMBLY More Info
----	---	--

OK

▼

17. CHECK FUEL SYSTEM

- a. Check for foreign matter such as iron particles around the fuel pump (fuel pump, fuel pump filter, and inside the fuel tank), and for signs that the fuel pump was stuck.

Result

Result	Proceed to
There is foreign matter or signs that fuel pump was stuck	A

Result	Proceed to
There is no foreign matter and no signs that fuel pump was stuck	B

Hint:

If there is foreign matter such as iron particles on the fuel pump, fuel filter or fuel tank, remove the foreign matter.

A	▶	REPAIR OR REPLACE FUEL SYSTEM
B	▶	GO TO STEP 24 GO TO STEP 24

18. READ FREEZE FRAME DATA

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored.

Click here [More Info](#)

Result

Freeze Frame Data Item	Result	Suspected Area	Proceed to
Coolant Temp	Engine coolant temperature is 40°C (104°F) or less*1	Fuel pressure regulator	A
	Engine coolant temperature is 40 to 90°C (104 to 194°F)*2	Fuel injector assembly	B
	Engine coolant temperature is 90°C (194°F) or higher*3	Fuel pressure regulator	A

Hint:

*1: If the engine coolant temperature is 40°C [104°F] or less (after stopping the engine and the vehicle is not driven for a long period of time), the fuel pressure regulator may be stuck open. Attach a fuel pressure gauge and check the ability to maintain fuel pressure after stopping the engine.

*2: If the engine coolant temperature is 40 to 90°C [104 to 194°F] (15 to 120 minutes have passed after stopping the engine), there may be fuel leaking from a fuel injector.

*3: If the engine coolant temperature is 90°C [194°F] or higher (2 to 5 minutes have passed after stopping the engine), there may be a problem with the fuel pressure regulator failing to maintain the fuel pressure. Attach a fuel pressure gauge and check the ability to maintain fuel pressure after stopping the engine.

B	▶	GO TO STEP 20
---	---	-------------------------------

A



19. CHECK FUEL PRESSURE

Hint:

For the fuel pressure inspection, refer to the following procedures.

Click here [More Info](#)

- Attach a fuel pressure gauge and check the fuel pressure after stopping the engine.

Standard

147 kPa (1.5 kgf/cm², 21 psi) or higher (5 minutes after stopping the engine)

Hint:

If the engine cannot be started, read the values after cranking the engine.

Result

Result	Proceed to
Abnormal	A
Normal	B

A	▶	REPLACE FUEL PRESSURE REGULATOR ASSEMBLY More Info
B	▶	GO TO STEP 24 GO TO STEP 24

20. INSPECT FUEL INJECTOR ASSEMBLY

- Clean the inside of the surge tank with compressed air.
- After stopping the engine, measure the HC concentration inside the surge tank for 15 minutes.

Result

Result	Proceed to
4000 ppm or higher	A
Less than 4000 ppm	B

Hint:

If the concentration is 4000 ppm or higher, a fuel injector assembly may have a sealing problem.

B	▶	GO TO STEP 22 GO TO STEP 22
---	---	---



21. INSPECT FUEL INJECTOR ASSEMBLY

- Inspect the fuel injector assemblies.

Click here [More Info](#)

Result

Result	Proceed to
Normal	A
Abnormal	B

Hint:

Perform "Inspection After Repair" after replacing the fuel injector assembly.

Click here [More Info](#)

A	▶	REPLACE FUEL INJECTOR ASSEMBLY More Info
B		
▼		

22. INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY

- a. Check if carbon is in the air flow passage.

Result

Result	Proceed to
No carbon present	A
Carbon in passage	B

Hint:

Perform "Inspection After Repair" after cleaning or replacing the throttle with motor body assembly.

Click here [More Info](#)

B	▶	CLEAN OR REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY More Info
A		
▼		

23. CHECK INTAKE SYSTEM

- a. Check the intake system for vacuum leaks.

Click here [More Info](#)

OK

No leak in intake system.

Hint:

Perform "Inspection After Repair" after repairing or replacing the intake system.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG	▶	REPAIR OR REPLACE INTAKE SYSTEM
----	---	---------------------------------

OK
▼

24. PERFORM SIMULATION TEST

- Check if the engine can be started.

Result

Result	Proceed to
Engine cannot be started	A
Engine can be started	B

B	▶	END
---	---	-----

A
▼

25. CONFIRM PROBLEM SYMPTOM

- Confirm the problem symptoms.

Hint:

The problem symptoms below can be determined by reading the freeze frame data.

Result

Problem Symptom	Suspected Area	Proceed to

Problem Symptom	Suspected Area	Proceed to
The engine does not crank	<ul style="list-style-type: none"> ■ Battery fully depleted ■ Starter assembly (includes pinion gear wear or teeth damage) ■ Starter system ■ Engine assembly (excess friction) ■ Drive plate and ring gear sub-assembly wear or teeth damage 	A
Abnormal cranking speed	<ul style="list-style-type: none"> ■ Battery fully depleted ■ Starter assembly ■ Engine assembly (excess friction, compression loss) 	B
There is no initial combustion (combustion does not occur even once)*1	<ul style="list-style-type: none"> ■ Fuel pressure regulator fuel pressure maintenance ■ Fuel injector assembly leak ■ Fuel leak from fuel line ■ Fuel pump control system ■ Fuel pump ■ Spark plug ■ Crankshaft position sensor system ■ Ignition coil assembly system 	C

Problem Symptom	Suspected Area	Proceed to
The engine stalls after starter turn off (engine stalls immediately after the first time the engine speed increases)*2	<ul style="list-style-type: none"> ■ Intake system connections ■ Throttle with motor body assembly ■ Camshaft timing oil control valve assembly ■ Mass air flow meter sub-assembly system 	D
The initial combustion and starter turnoff occur late*3	<ul style="list-style-type: none"> ■ Engine coolant temperature sensor ■ Mass air flow meter sub-assembly ■ Air fuel ratio sensor ■ Heated oxygen sensor ■ Fuel injector assembly ■ Spark plug ■ Fuel pressure regulator ■ Fuel pump ■ Fuel pump control system 	E

Hint:

- If there is hesitation (cranking speed is slow and combustion occurs before passing TDC) during the initial cranking period, the battery charge may be insufficient or the starter may be malfunctioning.
- *1: If there is no initial combustion, a wire harness may be malfunctioning, or the ignition or fuel system may be malfunctioning.
- *2: If the engine stalls after starter turnoff, the air fuel ratio may be incorrect or the camshaft timing oil control valve may have a problem returning.
- *3: If the initial combustion and starter turnoff occur late, the fuel injection volume may be incorrect (too low or too high).

B	▶	GO TO STEP 32
C	▶	GO TO STEP 35
D	▶	GO TO STEP 67 GO TO STEP 67
E	▶	GO TO STEP 49

A



26. PERFORM SIMULATION TEST

- a. When cranking the engine, check for a noise indicating that the starter pinion gear is extending, and check that the starter pinion gear is not spinning freely.

Result

Problem Symptom	Suspected Area	Proceed to
A noise indicating that the starter pinion gear is extending is heard and the starter pinion gear is not spinning freely.*1	<ul style="list-style-type: none"> ■ Battery ■ Excess engine friction ■ Starter assembly 	A
A noise indicating that the starter pinion gear is extending is heard but the starter pinion gear is spinning freely.	<ul style="list-style-type: none"> ■ Drive plate and ring gear sub-assembly ■ Starter assembly 	B
A noise indicating that the starter pinion gear is extending is not heard	<ul style="list-style-type: none"> ■ Battery ■ Starter assembly ■ Starter system 	C

Hint:

*1: The battery may be fully depleted or there may be excess engine friction.

B	▶	GO TO STEP 29
C	▶	GO TO STEP 30



27. INSPECT BATTERY

- a. Inspect the battery.

Click here [More Info](#)

Result

Proceed to
OK

Proceed to
NG

NG	▶	CHARGE OR REPLACE BATTERY
----	---	---------------------------



OK
▼



28. CHECK ENGINE ASSEMBLY

- a. Check that the crankshaft rotates smoothly when rotating it by hand.

OK

Crankshaft rotates smoothly.

Hint:

- Excess engine friction may have occurred temporarily. Remove the cylinder head cover and oil pan, and check for foreign matter such as iron fragments. If there is a malfunction or signs of a malfunction present, perform a detailed inspection by disassembling all the parts.
- Perform "Inspection After Repair" after replacing the engine assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

OK	▶	INSPECT STARTER ASSEMBLY More Info
NG	▶	REPAIR OR REPLACE ENGINE ASSEMBLY



29. INSPECT STARTER ASSEMBLY

- a. Remove the starter assembly.

Click here [More Info](#)

- b. Check for starter pinion gear wear and damage.

OK

There is no wear or damage.

Result

Proceed to
OK

Proceed to
NG

OK	▶	REPLACE REPLACE DRIVE PLATE AND RING GEAR SUB-ASSEMBLY
NG	▶	REPLACE STARTER ASSEMBLY More Info

30. INSPECT BATTERY

- a. Inspect the battery.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG	▶	CHARGE OR REPLACE BATTERY
----	---	---------------------------

OK



31. INSPECT STARTER ASSEMBLY

- a. Inspect the starter assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

OK	▶	CHECK STARTER SIGNAL CIRCUIT More Info
NG	▶	REPLACE STARTER ASSEMBLY More Info

32. PERFORM SIMULATION TEST

- a. Check the cranking speed.

Result

Problem Symptom	Suspected Area	Proceed to
Cranking speed is slow (100 rpm or less)	<ul style="list-style-type: none"> ■ Battery ■ Starter assembly ■ Excess engine friction 	A

Problem Symptom	Suspected Area	Proceed to
Cranking speed is fast (300 rpm or higher)*1	Engine compression loss	B

Hint:

- *1: If the cranking speed is fast, there may be compression loss.
- Perform "Inspection After Repair" after replacing the engine assembly.

Click here [More Info](#)

B	▶	CHECK AND REPAIR ENGINE ASSEMBLY
---	---	----------------------------------

A
▼

33. INSPECT BATTERY

- a. Inspect the battery.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG	▶	CHARGE OR REPLACE BATTERY
----	---	---------------------------

OK
▼

34. CHECK ENGINE ASSEMBLY

- a. Check that the crankshaft rotates smoothly when rotating it by hand.

OK

Crankshaft rotates smoothly.

Hint:

- Excess engine friction may have occurred temporarily. Remove the cylinder head cover and oil pan, and check for foreign matter such as iron fragments. If there is a malfunction or signs of a malfunction present, perform a detailed inspection by disassembling all the parts.
- Perform "Inspection After Repair" after replacing the engine assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

OK	▶	INSPECT STARTER ASSEMBLY More Info
NG	▶	CHECK AND REPAIR ENGINE ASSEMBLY

35. INSPECT FUEL INJECTOR ASSEMBLY

- a. Using a sound scope or screwdriver, check for an injector operating sound while cranking the engine.

OK

Fuel injector assembly operating sound is heard.

Result

Proceed to
OK
NG

NG	▶	GO TO STEP 47
----	---	-------------------------------

OK



36. CHECK FUEL PRESSURE

- a. Check the fuel pressure.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG	▶	GO TO STEP 45
----	---	-------------------------------

OK



37. CHECK SPARK PLUG AND SPARK

- a. Check for sparks.

Click here [More Info](#)

Result

Proceed to

OK

NG

NG

[GO TO STEP 41](#)

OK

**38. CONFIRM VEHICLE CONDITION**

- a. Confirm the conditions present when the malfunction occurred based on the customer problem analysis.

Result

Problem Symptom	Suspected Area	Proceed to
When the engine is stopped and a long time has passed, engine starting trouble occurs*1	Fuel pressure regulator is stuck open	A
When the engine is stopped and approximately 15 to 120 minutes have passed, engine starting trouble occurs*2	Fuel injector assembly leak	B
When the engine is stopped and approximately 2 to 3 minutes have passed, engine starting trouble occurs*3	Failure to maintain fuel pressure by fuel pressure regulator	A
Condition other than above, or there is an inconsistency in the conditions present when engine starting trouble occurs	-	C *4

Hint:

*1: The fuel pressure regulator may be stuck open. Attach a fuel pressure gauge and check the ability to maintain fuel pressure after stopping the engine.

*2: Fuel may be leaking from a fuel injector assembly.

*3: The fuel pressure regulator may not be able to maintain the fuel pressure. Attach a fuel pressure gauge and check the ability to maintain fuel pressure after stopping the engine.

*4: From step 62, perform fuel system troubleshooting C (steps 63 to 66, 72).

B

[GO TO STEP 40](#)

C

[GO TO STEP 62GO TO STEP 62](#)

A



39. CHECK FUEL PRESSURE

Hint:

For the fuel pressure inspection, refer to the following procedures.

Click here [More Info](#)

- a. Attach a fuel pressure gauge and check the fuel pressure after stopping the engine.

Standard

147 kPa (1.5 kgf/cm², 21 psi) or higher (5 minutes after stopping the engine)

Result

Result	Proceed to
Abnormal	A
Normal	B *1

Hint:

- If the engine cannot be started, read the values after cranking the engine.
- *1: from step 62, perform fuel system troubleshooting C (steps 63 to 66, 72).

A	▶ REPLACE FUEL PRESSURE REGULATOR ASSEMBLY More Info
B	▶ GO TO STEP 62 GO TO STEP 62

40. INSPECT FUEL INJECTOR ASSEMBLY

- a. Clean the inside of the surge tank with compressed air.
- b. After stopping the engine, measure the HC concentration inside the surge tank for 15 minutes.

Result

Result	Proceed to
4000 ppm or higher	A
Less than 4000 ppm	B *1

Hint:

- If the concentration is 4000 ppm or higher, a fuel injector may have a sealing problem.
- 1: From step 62, perform fuel system troubleshooting C (steps 63 to 66, 72).
- Perform "Inspection After Repair" after replacing the fuel injector assembly.

Click here [More Info](#)

A	▶	REPLACE FUEL INJECTOR ASSEMBLY More Info
B	▶	GO TO STEP 62 GO TO STEP 62

41. INSPECT SPARK PLUG

- Inspect the spark plugs.

Click here [More Info](#)

Hint:

- Even if the spark plug of only one cylinder is malfunctioning, replace the spark plugs of all cylinders.
- Perform "Inspection After Repair" after replacing the spark plug.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG	▶	REPLACE SPARK PLUG More Info
----	---	--

OK
▼

42. READ VALUE USING TECHSTREAM (ENGINE SPEED)

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine and ECT / Data List / Primary / Engine Speed.

Powertrain > Engine and ECT > Data List

Tester Display
Engine Speed

- Start the engine.
- While running the engine, read the [Engine Speed] value.

OK

A value that matches the actual engine speed is constantly output.

Hint:

- Check the engine speed using a line graph.
- If the engine cannot be started, check the engine speed while cranking the engine.

- If the engine speed is 0 rpm, the crankshaft position sensor may have an open or short circuit.

Result

Proceed to
OK
NG

NG

▶

CHECK CRANKSHAFT POSITION SENSOR CIRCUIT [More Info](#)

OK

▼

43. CHECK TERMINAL VOLTAGE (POWER SOURCE OF IGNITION COIL ASSEMBLY)
- a. Check the harnesses and connectors, referring to DTC P0351 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result

Proceed to
OK
NG

NG

▶

CHECK IGNITION COIL POWER SOURCE CIRCUIT [More Info](#)

OK

▼

44. CHECK HARNESS AND CONNECTOR (IGNITION COIL ASSEMBLY - ECM)
- a. Check the harnesses and connectors, referring to DTC P0351 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.
- If the wire harness is normal, after replacing the ignition coil assembly, check if engine starting trouble occurs again. If engine starting trouble occurs again, proceed to step 62 and perform troubleshooting for the ignition system (steps 74 to 82).

- Perform "Inspection After Repair" after replacing the ignition coil assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

OK	▶	REPLACE IGNITION COIL ASSEMBLY More Info
NG	▶	REPAIR OR REPLACE HARNESS OR CONNECTOR

45. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Enter the following menus: Powertrain / Engine and ECT / Active Test / Control the Fuel Pump / Speed.
 - w/ Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- w/o Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- When performing the Active Test, check for an operating sound from the fuel pump.

OK

Control the Fuel Pump / Speed	Specified Condition
ON	Operating sound heard
OFF	Operating sound not heard

Hint:

Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.

Result

Proceed to
OK
NG

NG	▶	CHECK FUEL PUMP CONTROL CIRCUIT More Info
----	---	---

OK
▼

46. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)
- a. Connect the Techstream to the DLC3.
 - b. Turn the ignition switch to ON.
 - c. Turn the Techstream on.
 - d. Enter the following menus: Powertrain / Engine and ECT / Active Test / Control the Fuel Pump / Speed.
 - w/ Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- w/o Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- e. When performing the Active Test, check for fuel leakage from the fuel pipes.

Result

Result	Proceed to
Fuel leakage or signs of fuel leakage are present	A
No fuel leakage or signs of fuel leakage	B

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Check if the vehicle ran out of fuel, as engine starting trouble due to running out of fuel is also detected.
- If there are no fuel leaks, after inspecting the fuel pump control system, check if engine starting trouble occurs again. If engine starting trouble occurs again, proceed to step 62

and perform fuel system troubleshooting C (steps 63 to 66, 72).

A	▶	REPAIR OR REPLACE FUEL LINE
B	▶	CHECK FUEL PUMP CONTROL CIRCUIT More Info

47. READ VALUE USING TECHSTREAM (ENGINE SPEED)

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine and ECT / Data List / Primary / Engine Speed.

Powertrain > Engine and ECT > Data List

Tester Display

Engine Speed

- Start the engine.
- While running the engine, read the [Engine Speed] value.

OK

A value that matches the actual engine speed is constantly output.

Hint:

- Check the engine speed using a line graph.
- If the engine cannot be started, check the engine speed while cranking the engine.
- If the engine speed is 0 rpm, the crankshaft position sensor may have an open or short circuit.

Result

Proceed to

OK

NG

NG	▶	REPLACE CRANKSHAFT POSITION SENSOR More Info
----	---	--

OK
▼

48. CHECK TERMINAL VOLTAGE (FUEL INJECTOR CIRCUIT)

- Check the harnesses and connectors, referring to DTC P0300 procedure.

Click here [More Info](#)

Hint:

Result

Proceed to	
OK	
NG	

OK	▶	REPLACE ECM More Info
NG	▶	CHECK FUEL INJECTOR CIRCUIT More Info

49. INSPECT ENGINE COOLANT TEMPERATURE SENSOR
- a. Inspect the engine coolant temperature sensor.

Click here [More Info](#)

Hint:

- If the engine coolant temperature sensor is malfunctioning, after replacing it, check if engine starting trouble occurs again. If engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 62 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.
- Perform "Inspection After Repair" after replacing the engine coolant temperature sensor.

Click here [More Info](#)

Result

Proceed to	
OK	
NG	

NG	▶	REPLACE ENGINE COOLANT TEMPERATURE SENSOR More Info
----	---	---

OK
▼

50. CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - ECM)
- a. Check the harnesses and connectors, referring to DTC P0115 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.
- If the wire harness or connector is malfunctioning, after replacing or repairing it, check if engine starting trouble occurs again. If engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 62 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.

Result

Proceed to
OK
NG

NG	▶	REPAIR OR REPLACE HARNESS OR CONNECTOR
----	---	--

OK
▼

51. INSPECT MASS AIR FLOW METER SUB-ASSEMBLY

- a. Inspect the mass air flow meter sub-assembly.

Click here [More Info](#)

Hint:

- If the mass air flow meter sub-assembly is malfunctioning, after replacing it, check if engine starting trouble occurs again. If engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 62 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.
- Perform "Inspection After Repair" after replacing the mass air flow meter sub-assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG	▶	REPLACE MASS AIR FLOW METER SUB-ASSEMBLY More Info
----	---	--

OK
▼

52. CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER ASSEMBLY - ECM)

- a. Check the harnesses and connectors, referring to DTC P0102 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.
- If the wire harness or connector is malfunctioning, after replacing or repairing it, check if engine starting trouble occurs again. If engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 62 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.

Result

Proceed to
OK
NG

NG	▶	REPAIR OR REPLACE HARNESS OR CONNECTOR
----	---	--

OK
▼

53. READ VALUE USING TECHSTREAM

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Engine and ECT / Data List / Gas AF Control / Long FT #1 and Atmosphere Pressure.

Powertrain > Engine and ECT > Data List

Tester Display
Atmosphere Pressure
Long FT #1

Result

Data List Item	Result	Suspected Area	Proceed to
Long FT #1	+25% or more or less than -25%		A

Data List Item	Result	Suspected Area	Proceed to
Atmosphere Pressure	80 kPa(abs) [600 mmHg(abs)] or less (when altitude is 0 m [0 ft.])	<ul style="list-style-type: none"> ■ Air fuel ratio sensor (sensor 1) ■ Heated oxygen sensor (sensor 2) ■ Mass air flow meter sub-assembly ■ Fuel injector assembly ■ ECM 	
Both Data List items listed above	Values are other than above	-	B

B ► [GO TO STEP 57](#)

A
▼

54. PERFORM SIMULATION TEST

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine and ECT / Utility / Learning Value Reset.
- Confirm the following conditions as instructed on the screen.
 - - Ignition switch ON
 - - Engine stopped
 - - Battery voltage 9 V or higher
- After confirming, select "Next" and initialize the learn value.

Hint:

If a message indicating learned value initialization failure is displayed on the screen, confirm the execution conditions, and perform learned value initialization again.

- Check if the engine can be started.

Result

Result	Proceed to
--------	------------

Result	Proceed to
Engine can be started	A
Engine cannot be started	B

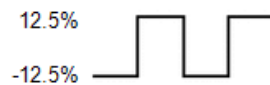
B ► [GO TO STEP 57](#)

A
▼

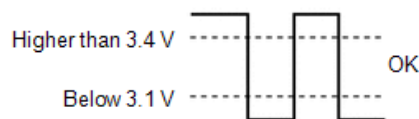
55. INSPECT AIR FUEL RATIO SENSOR

- Connect the Techstream to the DLC3.

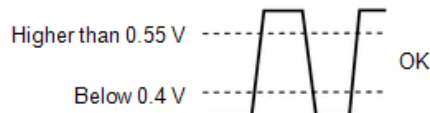
Injection Volume



Air Fuel Ratio Sensor Output Voltage



Heated Oxygen Sensor Output Voltage



- Start the engine.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine and ECT / Data List / Gas AF Control / Fuel System Status #1.

Powertrain > Engine and ECT > Data List

Tester Display
Fuel System Status #1

- Confirm that Fuel System Status #1 is CL.
- Enter the following menus: Powertrain / Engine and ECT / Data List / Gas AF Control / AF Lambda B1S1.

Powertrain > Engine and ECT > Data List

Tester Display**AF Lambda B1S1**

- g. Confirm that AF Lambda B1S1 is within the range of 0.95 to 1.05 when idling.
- h. Enter the following menus: Powertrain / Engine and ECT / Active Test / Control the Injection Volume for A/F Sensor / Gas AF Control / AFS Voltage B1S1 and O2S B1S2.

Powertrain > Engine and ECT > Active Test**Active Test Display****Control the Injection Volume for A/F Sensor****Data List Display****AFS Voltage B1S1****O2S B1S2**

- i. Read the output voltage from the air fuel ratio sensor when increasing and decreasing the fuel injection volume.

Standard

Techstream Display	Injection Volume	Specified Condition
AFS Voltage B1S1	+12.5%	Air fuel ratio sensor output voltage is below 3.1 V
	-12.5%	Air fuel ratio sensor output voltage is higher than 3.4 V

Result

Result	Proceed to
Normal	A
Abnormal	B

Hint:

- The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.
- If the air fuel ratio sensor is malfunctioning, after replacing it, check if engine starting trouble occurs again. If engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 62 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.
- Perform "Inspection After Repair" after replacing the air fuel ratio sensor.

Click here [More Info](#)

B	▶	REPLACE AIR FUEL RATIO SENSOR More Info
---	---	---

A
▼

56. PERFORM SIMULATION TEST

- Check if the idle speed is stable after starting the engine.

OK

Engine speed is stable.

Hint:

- After replacing the fuel injector assembly or mass air flow meter sub-assembly, check if engine starting trouble occurs again. If engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 62 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.
- Perform "Inspection After Repair" after replacing the fuel injector assembly or mass air flow meter sub-assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

OK	▶	REPLACE MASS AIR FLOW METER SUB-ASSEMBLY More Info
NG	▶	REPLACE FUEL INJECTOR ASSEMBLY More Info

57. CHECK FUEL PRESSURE

- Check the fuel pressure.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG	▶	GO TO STEP 73
----	---	-------------------------------

OK
▼

58. INSPECT SPARK PLUG

- a. Inspect the spark plugs.

Click here [More Info](#)

Result

Result	Proceed to
All cylinders are normal	A
One cylinder is abnormal*1	B
All cylinders are abnormal*2, *3	C

Hint:

- *1: If one cylinder is abnormal, replace the spark plug of that cylinder and inspect the ignition and fuel system for that cylinder. After performing repairs, check if engine starting trouble occurs again. If engine starting trouble still occurs, proceed to step 62 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.
- *2: If all cylinders are abnormal, replace the spark plugs of all cylinders and check if engine starting trouble occurs again. If engine starting trouble still occurs, proceed to step 62 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.
- *3: Engine starting trouble may occur if the vehicle is driven extremely short distances repeatedly.
- Perform "Inspection After Repair" after replacing the spark plug.

Click here [More Info](#)

B	▶	REPLACE SPARK PLUG (ABNORMAL CYLINDER) More Info
C	▶	REPLACE SPARK PLUG (ALL CYLINDER) More Info

A
▼

59. CONFIRM VEHICLE CONDITION

- a. Confirm the conditions present when the malfunction occurred based on the customer problem analysis.

Result

Problem Symptom	Suspected Area	Proceed to
When the engine is stopped and a long time has passed, engine starting trouble occurs*1	Fuel pressure regulator is stuck open	A

Problem Symptom	Suspected Area	Proceed to
When the engine is stopped and approximately 15 to 120 minutes have passed, engine starting trouble occurs*2	Fuel injector assembly leak	B
When the engine is stopped and approximately 2 to 3 minutes have passed, engine starting trouble occurs*3	Failure to maintain fuel pressure by fuel pressure regulator	A
Condition other than above, or there is an inconsistency in the conditions present when engine starting trouble occurs	-	C *4

Hint:

*1: The fuel pressure regulator may be stuck open. Attach a fuel pressure gauge and check the ability to maintain fuel pressure after stopping the engine.

*2: Fuel may be leaking from a fuel injector assembly.

*3: The fuel pressure regulator may not be able to maintain the fuel pressure. Attach a fuel pressure gauge and check the ability to maintain fuel pressure after stopping the engine.

*4: From step 62, perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.

B	▶	GO TO STEP 61
C	▶	GO TO STEP 62

A
▼

60. CHECK FUEL PRESSURE**Hint:**

For the fuel pressure inspection, refer to the following procedures.

Click here [More Info](#)

- a. Attach a fuel pressure gauge and check the fuel pressure after stopping the engine.

Standard

147 kPa (1.5 kgf/cm², 21 psi) or higher (5 minutes after stopping the engine)

Result

Result	Proceed to
Abnormal	A

Result	Proceed to
Normal	B *1

Hint:

- If the engine cannot be started, read the values after cranking the engine.
- *1: From step 62, perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.

A ▶	REPLACE FUEL PRESSURE REGULATOR ASSEMBLY More Info
B ▶	GO TO STEP 62 GO TO STEP 62

61. INSPECT FUEL INJECTOR ASSEMBLY

- Clean the inside of the surge tank with compressed air.
- After stopping the engine, measure the HC concentration inside the surge tank for 15 minutes.

Result

Result	Proceed to
4000 ppm or higher	A
Less than 4000 ppm	B *1

Hint:

- If the concentration is 4000 ppm or higher, a fuel injector assembly may have a sealing problem.
- *1: From step 62, perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.
- Perform "Inspection After Repair" after replacing the fuel injector assembly.

Click here [More Info](#)

A ▶	REPLACE FUEL INJECTOR ASSEMBLY More Info
B ▶	GO TO STEP 62 GO TO STEP 62

62. CHECK MALFUNCTION CONDITION

- If the malfunction could not be identified during the inspection in steps 38, 39, 40 and 46, perform fuel system troubleshooting C (steps 63 to 66, 72).

Result

Performed Step	Troubleshooting by System	Procedure	Proceed to
----------------	---------------------------	-----------	------------

Performed Step	Troubleshooting by System	Procedure	Proceed to
Steps 38, 39, 40 and 46	Fuel system troubleshooting C	63 to 66, 72	A

- b. If the malfunction could not be identified during the inspection in step 44, perform ignition system troubleshooting (steps 74 to 82).

Result

Performed Step	Troubleshooting by System	Procedure	Proceed to
Step 44	Ignition system troubleshooting	74 to 82	B

- c. If the malfunction could not be identified during the inspection in steps 71 and 92, perform intake air system troubleshooting (steps 83 to 85). If engine starting trouble still occurs, perform fuel system troubleshooting A (steps 86 to 91, 93, 94).

Result

Performed Step	Troubleshooting by System	Procedure	Proceed to
Step 71 and 92	Intake air system troubleshooting	83 to 85	C
	Fuel system troubleshooting A	86 to 91, 93, 94	

- d. If the malfunction could not be identified during the inspection in steps 49, 50, 51, 52, 55, 56, 58, 59, 60, 61 and 73, perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake air system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.

Result

Performed Step	Troubleshooting by System	Procedure	Proceed to
Steps 49, 50, 51, 52, 55, 56, 58, 59, 60, 61 and 73	Fuel system troubleshooting A	95 to 102	D
	Fuel system troubleshooting B	103 to 105	
	Intake air system troubleshooting	106 to 108	
	Ignition system troubleshooting	109 to 117	

B	▶	GO TO STEP 74
C	▶	GO TO STEP 83
D	▶	GO TO STEP 95

A
▼

63. INSPECT FUEL INJECTOR ASSEMBLY

- a. Inspect the fuel injector assemblies.

Click here [More Info](#)

Hint:

Perform "Inspection After Repair" after replacing the fuel injector assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG ► REPLACE FUEL INJECTOR ASSEMBLY [More Info](#)

OK
▼

64. CHECK TERMINAL VOLTAGE (FUEL INJECTOR CIRCUIT)

- a. Check the harnesses and connectors, referring to DTC P0300 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result

Proceed to
OK
NG

NG ► CHECK FUEL INJECTOR CIRCUIT [More Info](#)

OK
▼

65. REPLACE CRANKSHAFT POSITION SENSOR

- a. Replace the crankshaft position sensor.

Click here [More Info](#)

- b. Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result

Proceed to
OK
NG

OK	▶	END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)
NG	▼	

66. REPLACE CAMSHAFT POSITION SENSOR (FOR INTAKE CAMSHAFT)
- a. Replace the camshaft position sensor (for intake camshaft).

Click here [More Info](#)

- b. Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result

Proceed to
OK
NG

OK	▶	END (CAMSHAFT POSITION SENSOR (FOR INTAKE CAMSHAFT) IS DEFECTIVE)
NG	▶	GO TO STEP 72

67. INSPECT MASS AIR FLOW METER SUB-ASSEMBLY
- a. Inspect the mass air flow meter sub-assembly.

Click here [More Info](#)

Hint:

Perform "Inspection After Repair" after replacing the mass air flow meter sub-assembly.

Click here [More Info](#)

Result

Proceed to

Proceed to	
OK	
NG	

NG	▶	GO TO STEP 92
----	---	-------------------------------

OK
▼

68. CHECK INTAKE SYSTEM

- Check for air leaks in the intake system (vacuum hose disconnection, cracks, damaged gaskets, etc.).

Click here [More Info](#)

Hint:

- If the accelerator pedal is released after racing the engine, the inspection is easier to perform because the vacuum inside the intake manifold increases and the air suction noise becomes louder.
- If Short FT #1 and Long FT #1 are largely different from the normal values (differ by higher than 15%) when idling (intake air volume is small) and almost the same as the normal values when racing the engine (for example, when maintaining a speed of 3000 rpm) (intake air volume is high), air leakage may be present.

OK

There is no air leakage.

Hint:

Perform "Inspection After Repair" after repairing or replacing the intake system.

Click here [More Info](#)

Result

Proceed to	
OK	
NG	

NG	▶	REPAIR OR REPLACE INTAKE SYSTEM
----	---	---------------------------------

OK
▼

69. INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY

- Disconnect the throttle with motor body assembly connector.

Hint:

When the connector is disconnected, the vehicle enters fail-safe mode and the throttle valve opening angle is 4 to 7°.

- b. Crank the engine and check that it starts.

Result

Result	Proceed to
Engine starts	A
Engine does not start	B

Hint:

When this inspection is performed, the MIL may illuminate. After finishing the inspection, check and clear the DTCs.

Click here [More Info](#)

B ► [GO TO STEP 71](#)

A
▼

70. INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY

- a. Check if carbon is in the air flow passage.

OK

No carbon present.

Hint:

Perform "Inspection After Repair" after cleaning the throttle with motor body assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG ► REMOVE FOREIGN OBJECT AND CLEAN THROTTLE WITH MOTOR BODY ASSEMBLY [More Info](#)

OK
▼

71. PERFORM ACTIVE TEST USING TECHSTREAM (OPERATE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY)

- a. Operate the VVT system through the Active Test, and check if the VVT system is operating normally.

Perform the Active Test, referring to DTC P0011 procedure (VVT system for intake camshaft).

Click here [More Info](#)

Perform the Active Test, referring to DTC P0014 procedure (VVT system for exhaust camshaft).

Click here [More Info](#)

Result

Result	Proceed to
NG	A
OK	B

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- When the results of the inspection using the Active Test are normal but the valve operating noise is abnormal, check the valve for any signs of problems.
- *1: From step 62, perform intake system troubleshooting (steps 83 to 85). If engine starting trouble still occurs, perform fuel system troubleshooting A (steps 86 to 91, 93, 94).

A	▶ REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY (FOR INTAKE OR EXHAUST CAMSHAFT) More Info
B	▶ GO TO STEP 62 GO TO STEP 62

72. REPLACE CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT)

- a. Replace the camshaft position sensor (for exhaust camshaft).

Click here [More Info](#)

- b. Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result

Proceed to
OK
NG

OK	▶	END (CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT) IS DEFECTIVE)
NG	▶	REPLACE ECM More Info

73. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine and ECT / Active Test / Control the Fuel Pump / Speed.

- w/ Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- w/o Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- When performing the Active Test, check for fuel leakage from the fuel pipes.

Result

Result	Proceed to
Fuel leakage or signs of fuel leakage are present	A
No fuel leakage or signs of fuel leakage	B

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Check if the vehicle ran out of fuel, as engine starting trouble due to running out of fuel is also detected.
- If there are no fuel leaks, after inspecting the fuel pump control system, check if engine starting trouble occurs again. If engine starting trouble still occurs, proceed to step 62 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 117), in that order.

A	▶	REPAIR OR REPLACE FUEL LINE
B	▶	CHECK FUEL PUMP CONTROL CIRCUIT More Info

74. CHECK SENSOR INSTALLATION (CRANKSHAFT POSITION SENSOR)

- a. Check the tightening and installation condition of the crankshaft position sensor bolt.
- b. Check the connection of the crankshaft position sensor connector.

OK

Sensor is installed correctly.

Result

Proceed to
OK
NG

NG▶

SECURELY REINSTALL SENSOR [More Info](#)

OK

▼

75. CHECK SENSOR INSTALLATION (CAMSHAFT POSITION SENSOR (FOR INTAKE CAMSHAFT))

- a. Check the tightening and installation condition of the camshaft position sensor (for intake camshaft) bolt.
- b. Check the connection of the camshaft position sensor (for intake camshaft) connector.

OK

Sensor is installed correctly.

Result

Proceed to
OK
NG

NG▶

SECURELY REINSTALL SENSOR (FOR INTAKE CAMSHAFT) [More Info](#)

OK

▼

76. CHECK SENSOR INSTALLATION (CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT))

- a. Check the tightening and installation condition of the camshaft position sensor (for exhaust camshaft) bolt.
- b. Check the connection of the camshaft position sensor (for exhaust camshaft) connector.

OK

Sensor is installed correctly.

Result

Proceed to
OK
NG

NG	▶ SECURELY REINSTALL SENSOR (FOR EXHAUST CAMSHAFT) More Info
----	--

OK
▼

77. CHECK HARNESS AND CONNECTOR (CRANKSHAFT POSITION SENSOR - ECM)

- a. Check the harnesses and connectors, referring to DTC P0335 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result

Proceed to
OK
NG

NG	▶ REPAIR OR REPLACE HARNESS OR CONNECTOR
----	--

OK
▼

78. CHECK HARNESS AND CONNECTOR (CAMSHAFT POSITION SENSOR (FOR INTAKE CAMSHAFT) - ECM)

- a. Check the harnesses and connectors, referring to DTC P0340 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result

Proceed to
OK

Proceed to
NG

NG	▶	REPAIR OR REPLACE HARNESS OR CONNECTOR
----	---	--

OK
▼

79. CHECK HARNESS AND CONNECTOR (CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT) - ECM)
- a. Check the harnesses and connectors, referring to DTC P0365 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result

Proceed to
OK
NG

NG	▶	REPAIR OR REPLACE HARNESS OR CONNECTOR
----	---	--

OK
▼

80. REPLACE CRANKSHAFT POSITION SENSOR
- a. Replace the crankshaft position sensor.

Click here [More Info](#)

- b. Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result

Proceed to
OK
NG

OK	▶	END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)
----	---	---

NG
▼

81. REPLACE CAMSHAFT POSITION SENSOR (FOR INTAKE CAMSHAFT)
- a. Replace the camshaft position sensor (for intake camshaft).

Click here [More Info](#)

- b. Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result

Proceed to
OK
NG

OK	▶	END (CAMSHAFT POSITION SENSOR (FOR INTAKE CAMSHAFT) IS DEFECTIVE)
----	---	---

NG
▼

82. REPLACE CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT)
- a. Replace the camshaft position sensor (for exhaust camshaft).

Click here [More Info](#)

- b. Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result

Proceed to
OK
NG

OK	▶	END (CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT) IS DEFECTIVE)
NG	▶	REPLACE ECM More Info

83. READ VALUE USING TECHSTREAM (ISC LEARNING VALUE)
- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.

d. Enter the following menus: Powertrain / Engine and ECT / Data List / Primary / ISC Learning Value.

Powertrain > Engine and ECT > Data List

Tester Display
ISC Learning Value

e. Start the engine and warm it up until the engine coolant temperature stabilizes with the A/C switch and all the accessory switches off.

Result

Data List Item	Result	Suspected Area	Proceed to
ISC Learning Value	(engine displacement (liters) x 0.9) or higher	<ul style="list-style-type: none"> Valve timing Compression 	A
	Less than (engine displacement (liters) x 0.9)	-	B

B ► [GO TO STEP 85](#)

A
▼

84. CHECK CYLINDER COMPRESSION PRESSURE

a. Check the compression.

Click here [More Info](#)

Hint:

Perform "Inspection After Repair" after replacing the engine assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

OK	►	ADJUST VALVE TIMING More Info
NG	►	CHECK AND REPAIR ENGINE ASSEMBLY

85. INSPECT ENGINE COOLANT TEMPERATURE SENSOR

a. Inspect the engine coolant temperature sensor.

Click here [More Info](#)

Hint:

Perform "Inspection After Repair" after replacing the engine coolant temperature sensor.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG	▶	REPLACE ENGINE COOLANT TEMPERATURE SENSOR More Info
----	---	---

OK
▼

86. CHECK FUEL PRESSURE**Hint:**

For the fuel pressure inspection, refer to the following procedures.

Click here [More Info](#)

- a. Attach a fuel pressure gauge and check the fuel pressure when cranking the engine and after stopping the engine.

Standard

Vehicle State	Specified Condition
Cranking engine	304 kPa (3.1 kgf/cm ² , 44 psi) to 343 kPa (3.5 kgf/cm ² , 50 psi)
5 minutes after stopping engine	147 kPa (1.5 kgf/cm ² , 21 psi) or higher

Result

Proceed to
OK
NG

NG	▶	GO TO STEP 93
----	---	-------------------------------

OK
▼

87. READ VALUE USING TECHSTREAM (LONG FT #1)

- a. Connect the Techstream to the DLC3.

- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Engine and ECT / Data List / Gas AF Control / Long FT #1.

Powertrain > Engine and ECT > Data List

Tester Display

Long FT #1

Result

Data List Item	Result	Suspected Area	Proceed to
Long FT #1	-15 to +15%	<ul style="list-style-type: none"> ▪ Wire harness or connector ▪ Fuel 	A
	+15% or higher, or less than -15%	Fuel injector assembly	B

Hint:

Perform "Inspection After Repair" after replacing the fuel injector assembly.

Click here [More Info](#)

B ► REPLACE FUEL INJECTOR ASSEMBLY [More Info](#)

A
▼

88. PERFORM SIMULATION TEST

- a. Check if the idle speed after starting the engine is currently stable and has always been stable in the past.

Result

Problem Symptom	Suspected Area	Proceed to
Current unstable idle speed or history of unstable idle speed	Crankshaft position sensor system	A
All current and past idle speeds are stable	Fuel	B

Hint:

Through the customer problem analysis, confirm the fuel being used and the location at which the fuel was added to check if the malfunction is caused by the fuel in the vehicle.

B	▶	REPLACE FUEL
---	---	--------------

A
▼

89. CHECK SENSOR INSTALLATION (CRANKSHAFT POSITION SENSOR)

- a. Check the tightening and installation condition of the crankshaft position sensor bolt.
- b. Check the connection of the crankshaft position sensor connector.

OK

Sensor is installed correctly.

Result

Proceed to
OK
NG

NG	▶	SECURELY REINSTALL SENSOR More Info
----	---	---

OK
▼

90. CHECK HARNESS AND CONNECTOR (CRANKSHAFT POSITION SENSOR - ECM)

- a. Check the harnesses and connectors, referring to DTC P0335 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result

Proceed to
OK
NG

NG	▶	REPAIR OR REPLACE HARNESS OR CONNECTOR
----	---	--

OK
▼

91. REPLACE CRANKSHAFT POSITION SENSOR

- a. Replace the crankshaft position sensor.

Click here [More Info](#)

- b. Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result

Proceed to
OK
NG

OK	▶	END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)
NG	▶	REPLACE ECM More Info

92. CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER SUB-ASSEMBLY - ECM)

- a. Check the harnesses and connectors, referring to DTC P0102 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.
- If the wire harness is normal, after replacing the mass air flow meter sub-assembly, check if engine starting trouble occurs again. If engine starting trouble occurs again, proceed to step 62 and perform intake system troubleshooting (steps 83 to 85). If engine starting trouble still occurs, perform fuel system troubleshooting A (steps 86 to 91, 93, 94).
- Perform "Inspection After Repair" after replacing the mass air flow meter sub-assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

OK	▶	REPLACE MASS AIR FLOW METER SUB-ASSEMBLY More Info
NG	▶	REPAIR OR REPLACE HARNESS OR CONNECTOR

93. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.

d. Enter the following menus: Powertrain / Engine and ECT / Active Test / Control the Fuel Pump / Speed.

- w/ Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- w/o Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

e. When performing the Active Test, check for fuel leakage from the fuel pipes.

Result

Result	Proceed to
Fuel leakage or signs of fuel leakage are present	A
No fuel leakage or signs of fuel leakage	B

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- When performing the Active Test, if there is no operating noise from the fuel pump, the fuel pump system may be malfunctioning.
- Check if the vehicle ran out of fuel, as engine starting trouble due to running out of fuel is also detected.

A	▶	REPAIR OR REPLACE FUEL LINE
B	▼	

94. INSPECT FUEL PUMP

a. Inspect the fuel pump.

Click here [More Info](#)

Hint:

- Make sure there is no foreign matter such as iron particles on the fuel pump and no signs that the fuel pump was stuck.
- Make sure the internal connector is securely connected.

- Make sure the fuel pump filter is not clogged.
- Perform "Inspection After Repair" after replacing the fuel pump.

Click here [More Info](#)

Result

Proceed to
OK
NG

OK	▶	REPLACE FUEL PRESSURE REGULATOR ASSEMBLY More Info
NG	▶	REPLACE FUEL PUMP More Info

95. CHECK FUEL PRESSURE

Hint:

For the fuel pressure inspection, refer to the following procedures.

Click here [More Info](#)

- a. Attach a fuel pressure gauge and check the fuel pressure after stopping the engine.

Standard

147 kPa (1.5 kgf/cm², 21 psi) or higher (5 minutes after stopping the engine)

Hint:

If the engine cannot be started, read the values after cranking the engine.

Result

Result	Proceed to
Normal	A
Abnormal	B

B	▶	GO TO STEP 101
---	---	--------------------------------

A
▼

96. READ VALUE USING TECHSTREAM (LONG FT #1)

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Engine and ECT / Data List / Gas AF Control / Long FT #1.

Powertrain > Engine and ECT > Data List**Tester Display****Long FT #1****Result**

Data List Item	Result	Suspected Area	Proceed to
Long FT #1	-15 to +15%	<ul style="list-style-type: none"> Wire harness or connector Fuel 	A
	+15% or higher, or less than -15%	Fuel injector assembly	B

Hint:

Perform "Inspection After Repair" after replacing the fuel injector assembly.

Click here [More Info](#)

B ► REPLACE FUEL INJECTOR ASSEMBLY [More Info](#)

A
▼

97. PERFORM SIMULATION TEST

- Check if the idle speed after starting the engine is currently stable and has always been stable in the past.

Result

Problem Symptom	Suspected Area	Proceed to
Current unstable idle speed or history of unstable idle speed	Crankshaft position sensor system	A
All current and past idle speeds are stable	Fuel	B

Hint:

Through the customer problem analysis, confirm the fuel being used and the location at which the fuel was added to check if the malfunction is caused by the fuel in the vehicle.

B ► REPLACE FUEL

A
▼

98. CHECK SENSOR INSTALLATION (CRANKSHAFT POSITION SENSOR)

- a. Check the tightening and installation condition of the crankshaft position sensor bolt.
- b. Check the connection of the crankshaft position sensor connector.

OK

Sensor is installed correctly.

Result

Proceed to
OK
NG

NG	▶	SECURELY REINSTALL SENSOR More Info
----	---	---

OK
▼

99. CHECK HARNESS AND CONNECTOR (CRANKSHAFT POSITION SENSOR - ECM)

- a. Check the harnesses and connectors, referring to DTC P0335 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result

Proceed to
OK
NG

NG	▶	REPAIR OR REPLACE HARNESS OR CONNECTOR
----	---	--

OK
▼

100. REPLACE CRANKSHAFT POSITION SENSOR

- a. Replace the crankshaft position sensor.

Click here [More Info](#)

- b. Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result

Proceed to
OK
NG

OK	▶	END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)
NG	▶	REPLACE ECM More Info

101. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine and ECT / Active Test / Control the Fuel Pump / Speed.
 - w/ Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- w/o Fuel Pump Control ECU Assembly

Powertrain > Engine and ECT > Active Test

Tester Display
Control the Fuel Pump / Speed

- When performing the Active Test, check for fuel leakage from the fuel pipes.

Result

Result	Proceed to
Fuel leakage or signs of fuel leakage are present	A
No fuel leakage or signs of fuel leakage	B

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- When performing the Active Test, if there is no operating noise from the fuel pump, the fuel pump system may be malfunctioning.

- Check if the vehicle ran out of fuel, as engine starting trouble due to running out of fuel is also detected.

A	▶	REPAIR OR REPLACE FUEL LINE
B		
	▼	

102. INSPECT FUEL PUMP

- a. Inspect the fuel pump.

Click here [More Info](#)

Hint:

- Make sure there is no foreign matter such as iron particles on the fuel pump and no signs that the fuel pump was stuck.
- Make sure the internal connector is securely connected.
- Make sure the fuel pump filter is not clogged.
- Perform "Inspection After Repair" after replacing the fuel pump.

Click here [More Info](#)

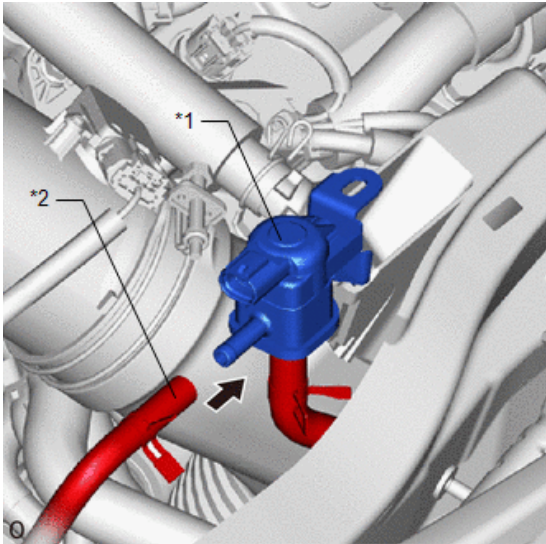
Result

Proceed to
OK
NG

NG	▶	REPLACE FUEL PUMP More Info
OK		
	▼	

103. CHECK PURGE VSV

- a. Disconnect the fuel vapor feed hose (on the canister side) of the purge VSV.



*1	Purge VSV
*2	Fuel Vapor Feed Hose (to Canister)

- b. Start the engine.
- c. Idle the engine.
- d. Disconnect the connector of the purge VSV.
- e. Check if air flows through the purge VSV.

OK

Air does not flow

Hint:

When this inspection is performed, the MIL may illuminate. After finishing the inspection, check and clear the DTCs.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG	▶	INSPECT PURGE VSV More Info
----	---	---

OK
▼

104. INSPECT FUEL INJECTOR ASSEMBLY

- a. Clean the inside of the surge tank with compressed air.
- b. After stopping the engine, measure the HC concentration inside the surge tank for 15 minutes.

Result

Result	Proceed to
4000 ppm or higher	A
Less than 4000 ppm	B

Hint:

- If the concentration is 4000 ppm or higher, a fuel injector assembly may have a sealing problem.
- Perform "Inspection After Repair" after replacing the fuel injector assembly.

Click here [More Info](#)

A ► REPLACE FUEL INJECTOR ASSEMBLY [More Info](#)

B
▼

105. CHECK INTAKE VALVE

- a. Check if carbon is on the intake valves.

Result

Result	Proceed to
Carbon present	A
No carbon present	B

A ► CLEAN INTAKE VALVE

B
▼

106. READ VALUE USING TECHSTREAM (ISC LEARNING VALUE)

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Powertrain / Engine and ECT / Data List / Primary / ISC Learning Value.

Powertrain > Engine and ECT > Data List

Tester Display
ISC Learning Value

- e. Start the engine and warm it up until the engine coolant temperature stabilizes with the A/C switch and all the accessory switches off.

Result

Data List Item	Result	Suspected Area	Proceed to
ISC Learning Value	(engine displacement (liters) x 0.9) or more	<ul style="list-style-type: none"> Valve timing Compression 	A
	Less than (engine displacement (liters) x 0.9)	-	B

B ► [GO TO STEP 108](#)

A
▼

107. CHECK CYLINDER COMPRESSION PRESSURE

- a. Check the compression.

Click here [More Info](#)

Hint:

Perform "Inspection After Repair" after replacing the engine assembly.

Click here [More Info](#)

Result

Proceed to
OK
NG

OK	►	ADJUST VALVE TIMING More Info
NG	►	CHECK AND REPAIR ENGINE ASSEMBLY

108. INSPECT ENGINE COOLANT TEMPERATURE SENSOR

- a. Inspect the engine coolant temperature sensor.

Click here [More Info](#)

Hint:

Perform "Inspection After Repair" after replacing the engine coolant temperature sensor.

Click here [More Info](#)

Result

Proceed to
OK
NG

NG

REPLACE ENGINE COOLANT TEMPERATURE SENSOR [More Info](#)

OK



109. CHECK SENSOR INSTALLATION (CRANKSHAFT POSITION SENSOR)

- Check the tightening and installation condition of the crankshaft position sensor bolt.
- Check the connection of the crankshaft position sensor connector.

OK

Sensor is installed correctly.

Result

Proceed to
OK
NG

NG

SECURELY REINSTALL SENSOR [More Info](#)

OK



110. CHECK SENSOR INSTALLATION (CAMSHAFT POSITION SENSOR (FOR INTAKE CAMSHAFT))

- Check the tightening and installation condition of the camshaft position sensor (for intake camshaft) bolt.
- Check the connection of the camshaft position sensor (for intake camshaft) connector.

OK

Sensor is installed correctly.

Result

Proceed to
OK
NG

NG

SECURELY REINSTALL SENSOR (FOR INTAKE CAMSHAFT) [More Info](#)

OK



111. CHECK SENSOR INSTALLATION (CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT))
- a. Check the tightening and installation condition of the camshaft position sensor (for exhaust camshaft) bolt.

b. Check the connection of the camshaft position sensor (for exhaust camshaft) connector.

OK

Sensor is installed correctly.

Result

Proceed to
OK
NG

NG

▶

SECURELY REINSTALL SENSOR (FOR EXHAUST CAMSHAFT) [More Info](#)

OK

▼

112. CHECK HARNESS AND CONNECTOR (CRANKSHAFT POSITION SENSOR - ECM)
- a. Check the harnesses and connectors, referring to DTC P0335 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result

Proceed to
OK
NG

NG

▶

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

▼

113. CHECK HARNESS AND CONNECTOR (CAMSHAFT POSITION SENSOR (FOR INTAKE CAMSHAFT) - ECM)
- a. Check the harnesses and connectors, referring to DTC P0340 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result

Proceed to
OK
NG

NG	▶	REPAIR OR REPLACE HARNESS OR CONNECTOR
----	---	--

OK
▼

114. CHECK HARNESS AND CONNECTOR (CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT) - ECM)

- Check the harnesses and connectors, referring to DTC P0365 procedure.

Click here [More Info](#)

Hint:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

Result

Proceed to
OK
NG

NG	▶	REPAIR OR REPLACE HARNESS OR CONNECTOR
----	---	--

OK
▼

115. REPLACE CRANKSHAFT POSITION SENSOR

- Replace the crankshaft position sensor.

Click here [More Info](#)

- Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result

Proceed to
OK
NG

OK	▶	END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)
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NG
▼

116. REPLACE CAMSHAFT POSITION SENSOR (FOR INTAKE CAMSHAFT)

- a. Replace the camshaft position sensor (for intake camshaft).

Click here [More Info](#)

- b. Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result

Proceed to
OK
NG

OK	▶	END (CAMSHAFT POSITION SENSOR (FOR INTAKE CAMSHAFT) IS DEFECTIVE)
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NG
▼

117. REPLACE CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT)

- a. Replace the camshaft position sensor (for exhaust camshaft).

Click here [More Info](#)

- b. Check the engine start operation.

OK

Malfunction has been repaired successfully.

Result

Proceed to
OK
NG

OK	▶	END (CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT) IS DEFECTIVE)
NG	▶	REPLACE ECM More Info

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