DTC	P261B	Coolant Pump "B" Control Malfunction
DTC	P261C	Short in Coolant Pump "B" Control Circuit
DTC	P261D	Open in Coolant Pump "B" Control Circuit

DESCRIPTION

The ECM controls the water pump assembly by calculating the necessary amount of coolant flow based on engine coolant temperature, engine speed and vehicle speed information. The speed of the water pump assembly is controlled steplessly using duty cycle signal sent from the ECM. This optimal control enhances warm-up performance and reduces cooling losses, thus reducing the specific fuel consumption of the engine.

DTC No.	DTC Detection Condition	Trouble Area
P261B	Water pump speed is less than 900 rpm while the water pump assembly is operating (1 trip detection logic)	• Open or short in water pump assembly circuit • Water pump assembly • ECM
P261C	Water pump output voltage is less than specified value while the water pump assembly is operating (1 trip detection logic)	• Short in water pump assembly circuit • Water pump assembly • ECM
P261D	Water pump output voltage is higher than specified value while the water pump assembly is operating (1 trip detection logic)	• Open in water pump assembly circuit • Water pump assembly • ECM

MONITOR DESCRIPTION

The ECM calculates the speed of the water pump assembly using a duty cycle signal sent from the water pump assembly. When the speed of the water pump assembly becomes less than 900 rpm while it is operating, the ECM detects the malfunction and stores DTC P261B.

The water pump assembly operates steplessly based on a duty cycle signal sent from the ECM. The ECM monitors the current of the water pump assembly. If actual drive duty cycle ratio does not correspond to the target drive duty cycle , the ECM detects the malfunction and stores DTC P261C and P261D.

MONITOR STRATEGY

Related DTCs	P261B: Engine coolant pump circuit performance P261C: Engine coolant pump circuit range check (low voltage) P261D: Engine coolant pump circuit range check (high voltage)

Required Sensors/Components (Main)	Water pump assembly
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	15 seconds: Engine coolant pump circuit performance 3 seconds: Engine coolant pump circuit range check (low voltage, high voltage)
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs are not present	None
Battery voltage	8 V or more
Power switch	On (IG)
Time after power switch off to on (IG)	0.5 seconds or more

P261B: Engine Coolant Pump Circuit Performance

Output signal duty ratio	40% or more
Monitor synchronism monitor status	Enable
Engine coolant temperature	-10°C (14 °F) or more
Engine coolant temperature circuit circuit fail (P0115, P0117, P0118)	Not detected
Engine coolant pump circuit range check low voltage fail (P261C)	Not detected
Engine coolant pump circuit range check high voltage fail (P261D)	Not detected

P261C, P261D: Engine Coolant Pump Circuit Range Check (Low Voltage, High Voltage)

Output signal duty ratio	40 to 60%
Engine coolant pump circuit performance fail (P261B)	Not detected
Engine coolant pump output terminal voltage monitor counter	0.08 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

P261B: Engine Coolant Pump Circuit Performance

Motor speed	Less than 900 rpm

P261C: Engine Coolant Pump Circuit Range Check (Low Voltage)

Current engine coolant pump output terminal voltage	Low
Engine coolant pump output monitor	Fail

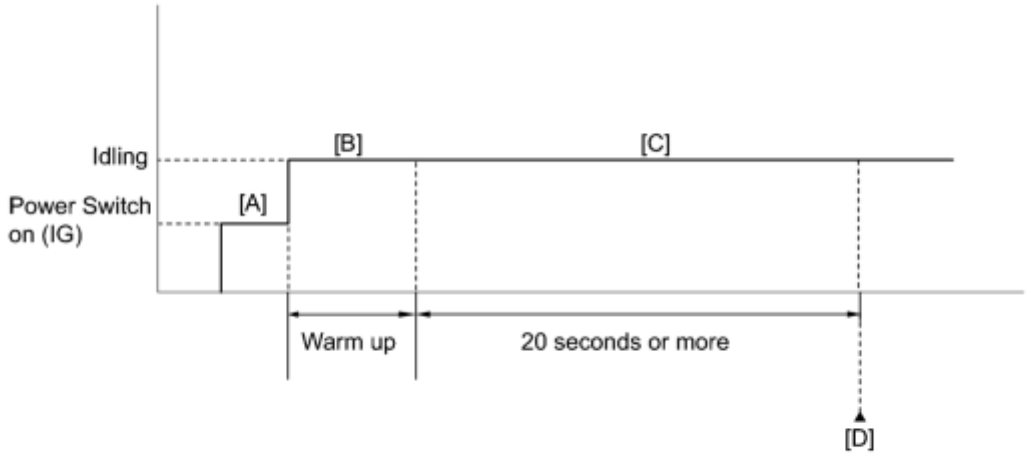
P261D: Engine Coolant Pump Circuit Range Check (High Voltage)

Current engine coolant pump output terminal voltage	High
Engine coolant pump output monitor	Fail

COMPONENT OPERATING RANGE

Motor speed	900 rpm or more

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the power 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 power switch off and wait for 30 seconds.
5. Turn the power switch on (IG) and turn the Techstream on [A].
6. Put the engine in inspection mode INFO.
7. Start the engine and warm it up (until the engine coolant temperature is 75°C (167°F) or higher) [B].
8. Idle the engine for 20 seconds or more [C].
9. Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.
10. Read the DTC [D].
11. If the DTC is output, the system is malfunctioning.

HINT:

If a DTC is not output, perform the following procedure.

12. Enter the following menus: Powertrain / Engine and ECT / Utility / All Readiness.
13. Input the DTC: P261B, P261C or P261D.
14. Check the DTC judgment result.

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
UNKNOWN	○ Unable to perform DTC judgment ○ Number of DTCs which do not fulfill DTC preconditions has reached ECU 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 UNKNOWN, perform steps [C] again.

15. Enter the following menus: Powertrain / Engine and ECT / Utility / All Readiness.
16. Check the judgment result.

HINT:

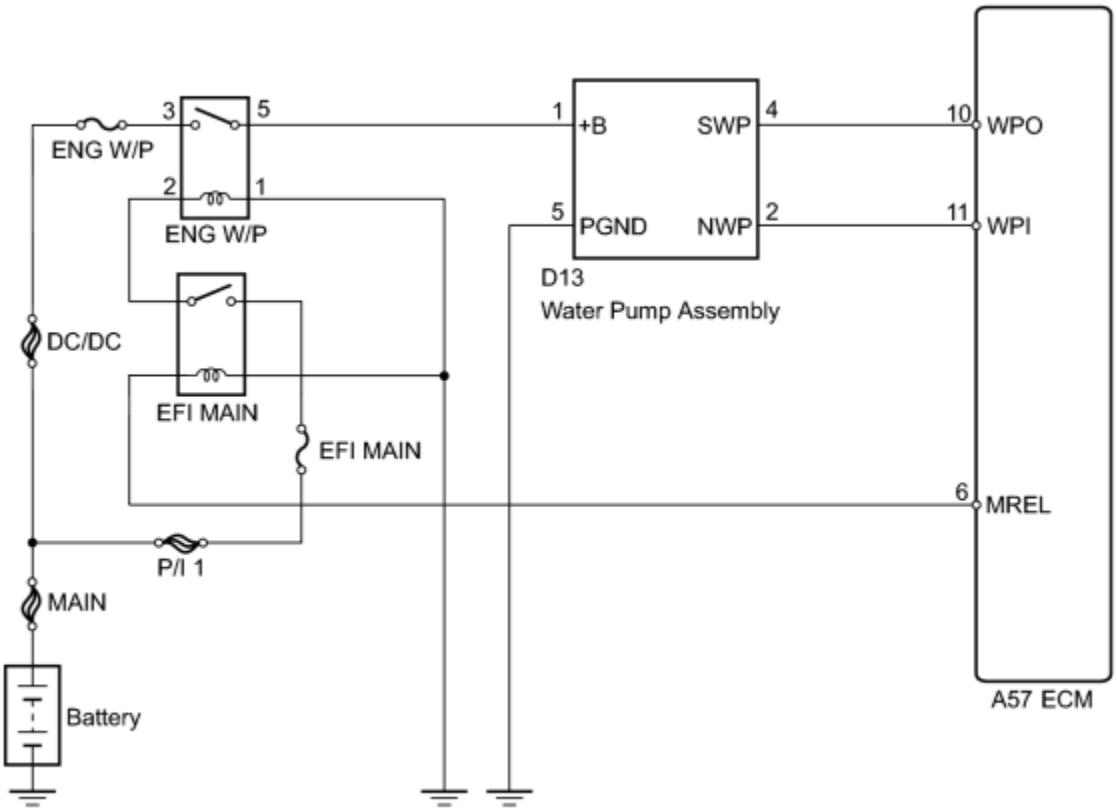
- If the judgment result shows ABNORMAL, the system has a malfunction.
- If the judgment result shows NORMAL, the system is normal.

17. If the test result is INCOMPLETE or UNKNOWN and 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

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

Read freeze frame data using the 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.

PROCEDURE

1.	PERFORM ACTIVE TEST USING TECHSTREAM (ACTIVATE THE ELECTRIC WATER PUMP)

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on (IG).

(c) Turn the Techstream on.

(d) Put the engine in inspection mode INFO.

(e) Start the engine.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test / Activate the Electric Water Pump.

(g) Touch the water pump and check that the pump is operating (vibrating).

OK:

The water pump is operating (vibrating).

NG ▶ CHECK WATER PUMP ASSEMBLY (POWER SOURCE)

OK ▼

2.	CHECK HARNESS AND CONNECTOR (WATER PUMP ASSEMBLY - ECM)

HINT:

Confirm a good connection at the water pump assembly and ECM connectors.

(a) Disconnect the water pump assembly connector.

(b) Disconnect the ECM connector.

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

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
D13-2 (NWP) - A57-11 (WPI)	Always	Below 1 Ω

Tester Connection	Condition	Specified Condition
D13-4 (SWP) - A57-10 (WPO)	Always	Below 1 Ω

Standard Resistance (Check for Short):

Tester Connection	Condition	Specified Condition
D13-2 (NWP) or A57-11 (WPI) - Body ground	Always	10 kΩ or higher
D13-4 (SWP) or A57-10 (WPO) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	Front view of wire harness connector (to Water Pump Assembly)	*2	Front view of wire harness connector (to ECM)

(d) Reconnect the water pump assembly connector.

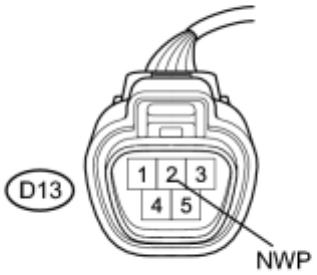
(e) Reconnect the ECM connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (WATER PUMP ASSEMBLY - ECM)

OK ▼

3.	CHECK ECM (WPI VOLTAGE)

*1



(a) Disconnect the water pump assembly connector.

c

(b) Turn the power switch on (IG).

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
D13-2 (NWP) - Body ground	Power switch on (IG)	11 to 14 V

Text in Illustration

*1	Front view of wire harness connector (to Water Pump Assembly)

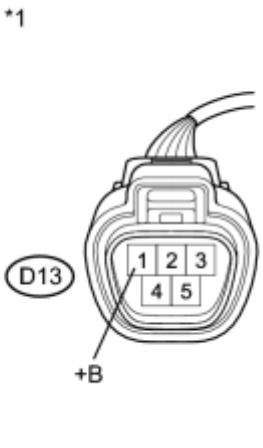
(d) Reconnect the water pump assembly connector.

NG ▶ REPLACE ECM
OK ▶ **REPLACE WATER PUMP ASSEMBLY**

4.	CHECK WATER PUMP ASSEMBLY (POWER SOURCE)

HINT:

Confirm a good connection at the water pump assembly and ECM connectors.



(a) Disconnect the water pump assembly connector.

(b) Turn the power switch on (IG).

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
D13-1 (+B) - Body ground	Power switch on (IG)	11 to 14 V

Text in Illustration

*1	Front view of wire harness connector (to Water Pump Assembly)

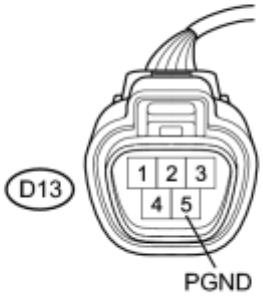
(d) Reconnect the water pump assembly connector.

NG ▶ INSPECT ENG W/P RELAY

OK ▼

5.	CHECK HARNESS AND CONNECTOR (WATER PUMP ASSEMBLY - BODY GROUND)

*1



c

(a) Disconnect the water pump assembly connector.

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

Standard Resistance (Check for Open):

Tester Connection	Switch Condition	Specified Condition
D13-5 (PGND) - Body ground	Always	Below 1 Ω

Text in Illustration

*1	Front view of wire harness connector (to Water Pump Assembly)

(c) Reconnect the water pump assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (WATER PUMP ASSEMBLY - BODY GROUND)

OK ▼

6.	CHECK HARNESS AND CONNECTOR (WATER PUMP ASSEMBLY - ECM)

(a) Disconnect the water pump assembly connector.

(b) Disconnect the ECM connector.

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

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
D13-2 (NWP) - A57-11 (WPI)	Always	Below 1 Ω
D13-4 (SWP) - A57-10 (WPO)	Always	Below 1 Ω

Standard Resistance (Check for Short):

Tester Connection	Condition	Specified Condition
D13-2 (NWP) or A57-11 (WPI) - Body ground	Always	10 kΩ or higher
D13-4 (SWP) or A57-10 (WPO) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	Front view of wire harness connector (to Water Pump Assembly)	*2	Front view of wire harness connector (to ECM)

(d) Reconnect the water pump assembly connector.

(e) Reconnect the ECM connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (WATER PUMP ASSEMBLY - ECM)

OK ▼

7.	REPLACE WATER PUMP ASSEMBLY

(a) Replace the water pump assembly INFO.

NEXT

8.	CHECK WHETHER DTC OUTPUT RECURS (DTC P261B, P261C OR P261D)

(a) Connect the Techstream to the DLC3.

(b) Turn the power switch on.

(c) Turn the Techstream on.

(d) Put the engine in inspection mode INFO.

(e) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.

(f) Enter the following menus: Powertrain / Engine and ECT / Trouble codes.

(g) Read the DTCs.

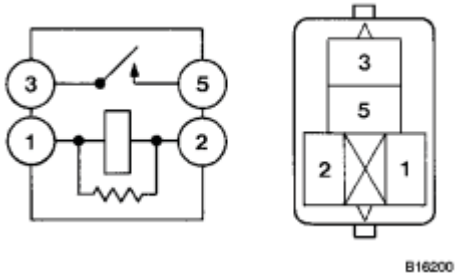
Result:

Result	Proceed to
DTC P261B, P261C or P261D is output	A
DTC is not output	B

B ▶ END

A ▶ **REPLACE ECM**

9.	INSPECT ENG W/P RELAY



(a) Remove the ENG W/P relay from the engine room relay block.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
3 - 5	No battery voltage applied between terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage applied between terminals 1 and 2	Below 1 Ω

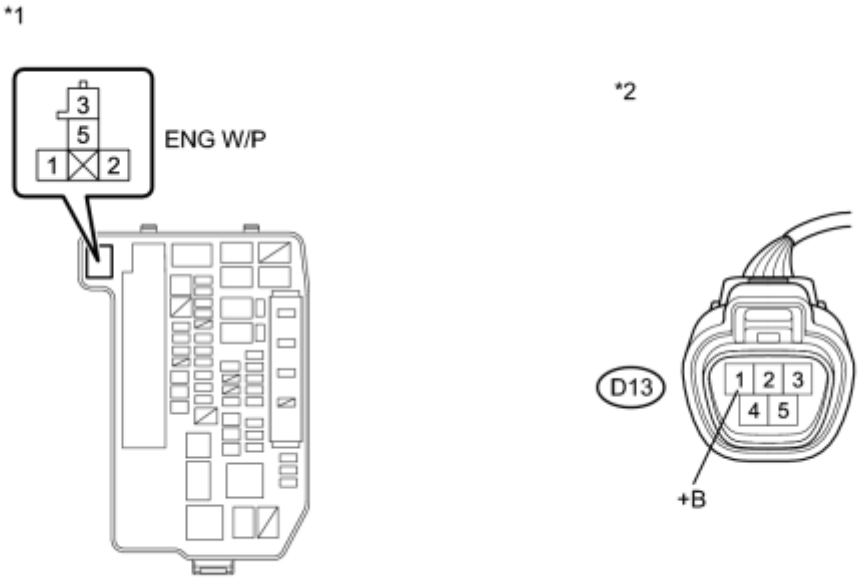
(c) Reinstall the ENG W/P relay to the engine room relay block.

NG ▶ REPLACE ENG W/P RELAY

OK

10.	CHECK HARNESS AND CONNECTOR (ENG W/P RELAY - WATER PUMP ASSEMBLY)

(a) Remove the ENG W/P relay from the engine room relay block.



(b) Disconnect the water pump assembly connector.

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

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
ENG W/P relay terminal 5 - D13-1 (+B)	Always	Below 1 Ω

Standard Resistance (Check for Short):

Tester Connection	Condition	Specified Condition
ENG W/P relay terminal 5 or D13-1 (+B) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	Engine Room Relay Block	*2	Front view of wire harness connector (to Water Pump Assembly)

(d) Reinstall the ENG W/P relay to the engine room relay block.

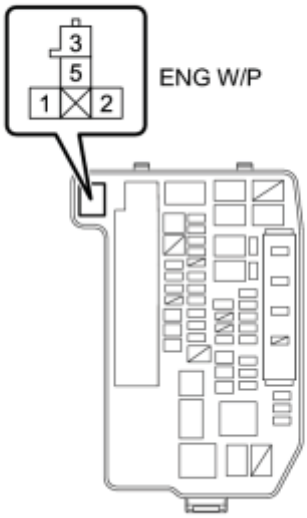
(e) Reconnect the water pump assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (ENG W/P RELAY - WATER PUMP ASSEMBLY)

OK ▼

11.	CHECK ENG W/P RELAY (POWER SOURCE)

*1



(a) Remove the ENG W/P relay from the engine room relay block.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
ENG W/P relay terminal 3 - Body ground	Always	11 to 14 V

Text in Illustration

*1	Engine Room Relay Block

(c) Reinstall the ENG W/P relay to the engine room relay block.

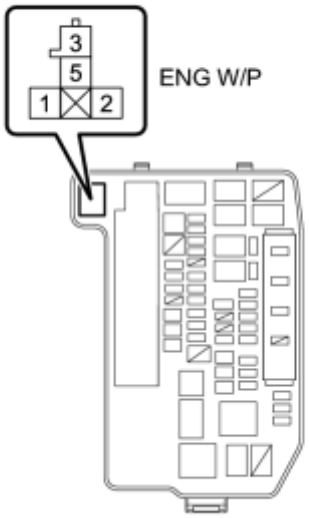
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (ENG W/P RELAY - BATTERY)

OK ▼

12.	CHECK HARNESS AND CONNECTOR (ENG W/P RELAY - BODY GROUND)

(a) Remove the ENG W/P relay from the engine room relay block.

*1



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

Standard Resistance (Check for Open):

Tester Connection	Switch Condition	Specified Condition
ENG W/P relay terminal 1 - Body ground	Always	Below 1 Ω

Text in Illustration

*1	Engine Room Relay Block

(c) Reinstall the ENG W/P relay to the engine room relay block.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (ENG W/P RELAY - BODY GROUND)
OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (ENG W/P RELAY - EFI MAIN RELAY)**