Last Modified: 01-14-2019	6.8:8.0.48	**Doc ID:** RM100000000QJZA
Model Year Start: 2016	**Model:** Prius	**Prod Date Range:** [11/2015 -]
Title: 2ZR-FXE (ENGINE CONTROL): SFI SYSTEM: P148F00; Engine Coolant Pump Over Revolution; 2016 - 2019 MY Prius [11/2015 -]		

DTC	**P148F00**	**Engine Coolant Pump Over Revolution**

DESCRIPTION

The ECM controls the engine 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 engine water pump assembly is controlled steplessly using a 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.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	MEMORY	NOTE
P148F00	Engine Coolant Pump Over Revolution	When both of the following conditions are met for 5 seconds or more (1 trip detection logic): • Engine water pump assembly duty cycle is 85% or higher. • Actual engine water pump assembly speed exceeds the target for a certain amount of time.	• Lack of engine coolant • Engine coolant leak • Engine water pump assembly	Does not come on	DTC stored	• SAE Code: P148F • DTC for Mexico Models: Applies

MONITOR DESCRIPTION

The ECM monitors the speed of the engine water pump assembly and stores a DTC when it determines that the engine water pump assembly rotates excessively based on the fact that the actual speed is higher than the target for a certain amount of time. (However, the MIL will not illuminate.)

CAUTION / NOTICE / HINT

HINT:

- DTC P148F00 may be stored if the engine has continuously run with insufficient engine coolant. If the engine coolant is sufficient and DTC P148F00 recur when the vehicle is brought to the workshop, confirm whether engine coolant was added after the vehicle had been driven with insufficient engine coolant.
- 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 help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	**CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P148F00)**

(a) Connect the Techstream to the DLC3.

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

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Trouble Codes.

(e) Read the DTCs.

Powertrain > Engine > Trouble Codes

RESULT	PROCEED TO
DTC P148F00 is output	A
DTC P148F00 and other DTCs are output	B

HINT:

If any DTCs other than P148F00 are output, troubleshoot those DTCs first.

B ▶ **GO TO DTC CHART** INFO INFO INFO INFO

A ▼

2.	**CHECK RESERVE SEALED TANK WITHOUT CAP (ENGINE COOLANT LEVEL)**

(a) Check that the engine coolant level is between the FULL and LOW lines.

RESULT	PROCEED TO
Engine coolant level is below the LOW line	A
Engine coolant level is above the LOW line	B

B ▶ **GO TO STEP 6**

A ▼

3.	**CHECK FOR ENGINE COOLANT LEAKS**

(a) Check the areas around the engine and heater for engine coolant leaks.

HINT:

If the engine oil is cloudy during the engine oil level gauge check, it means that engine coolant has entered the engine lubrication system.

OK:

No leaks.

NG ▶ **GO TO STEP 5**

OK ▼

4.	**ADD ENGINE COOLANT**

(a) Fill the reservoir tank up to the FULL line with engine coolant.

NOTICE:

Make sure not to add engine coolant when the engine is hot.

NEXT ▶ **GO TO STEP 6**

5.	**REPAIR OR REPLACE MALFUNCTIONING PARTS, COMPONENT AND AREA**

(a) Repair any engine coolant leaks.

HINT:

Add engine coolant and perform air bleeding after repair.

NEXT ▼

6.	**CLEAR DTC**

(a) Connect the Techstream to the DLC3.

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

(c) Turn the Techstream on.

(d) Clear the DTCs.

Powertrain > Engine > Clear DTCs

(e) Turn the power switch off and wait for at least 30 seconds.

NEXT

7.	INSPECT ENGINE WATER PUMP ASSEMBLY

HINT:

Perform this inspection indoors.

(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 (Maintenance Mode).

Powertrain > Hybrid Control > Utility

TESTER DISPLAY
Inspection Mode

(e) Start the engine.

(f) Enter the following menus: Powertrain / Engine / Data List / Coolant Temperature and Electric Water Pump Speed.

HINT:

Display the Data List items on the graph view.

Powertrain > Engine > Data List

TESTER DISPLAY
Coolant Temperature
Electric Water Pump Speed

(g) Idle the engine for about 20 minutes and check Coolant Temperature, Electric Water Pump Speed using the Techstream, and check the cooling fans.

RESULT	PROCEED TO
Either of the following conditions is met: • The engine coolant temperature becomes 95°C (203°F) or higher and the engine water pump assembly performs intermittent operation (5 seconds pause after 25 seconds operation). • The engine water pump assembly does not start operating even after the engine coolant temperature becomes 95°C (203°F) or higher.*1, *2	A

The cooling fans start operating after the engine coolant temperature becomes 95°C (203°F) or less and a decrease in the engine coolant temperature is observed.*3	B

HINT:

- *1: Be careful when the cooling fans do not start operating even after the engine coolant temperature becomes 95°C (203°F) or higher because the engine coolant temperature increases rapidly. (Make sure to stop the engine if the engine coolant temperature becomes 105°C (221°F) or higher.)
- *2: If the ECM voltage is 14 V or higher and the engine water pump assembly is operated excessively due to insufficient coolant etc., the Electric Water Pump Speed will exceed 5300 rpm. Enter the following menus to check the voltage of the ECM: Powertrain / Engine / Data List / Battery Voltage.
- *3: When the engine is warmed up, the cooling fans operate and the engine coolant temperature will decrease. After the cooling fans begin operating, the engine coolant temperature will stabilize between 88 to 95°C (190 to 203°F).

B ▶ **END**

A

8.	**REPLACE ENGINE WATER PUMP ASSEMBLY**

(a) Replace the engine water pump assembly.

HINT:

Click here INFO

NEXT

9.	**ADD ENGINE COOLANT**

(a) Fill the reservoir tank up to the FULL line with engine coolant.

NOTICE:

Make sure not to add engine coolant when the engine is hot.

NEXT

10.	**CLEAR DTC**

(a) Connect the Techstream to the DLC3.

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

(c) Turn the Techstream on.

(d) Clear the DTCs.

Powertrain > Engine > Clear DTCs

(e) Turn the power switch off and wait for at least 30 seconds.

NEXT

11.	CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

HINT:

Perform this inspection indoors.

(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 (Maintenance Mode).

Powertrain > Hybrid Control > Utility

TESTER DISPLAY
Inspection Mode

(e) Start the engine.

(f) Enter the following menus: Powertrain / Engine / Data List / Coolant Temperature and Electric Water Pump Speed.

Powertrain > Engine > Data List

TESTER DISPLAY
Coolant Temperature
Electric Water Pump Speed

(g) Idle the engine for about 20 minutes and check Coolant Temperature, Electric Water Pump Speed using the Techstream, and check the cooling fans.

OK:

The cooling fans start operating after the engine coolant temperature becomes 95°C (203°F) or less and a decrease in the engine coolant temperature is observed.

NEXT **END**

Last Modified: 01-14-2019	6.8:8.0.48	**Doc ID:** RM100000000QJZM
Model Year Start: 2016	**Model:** Prius	**Prod Date Range:** [11/2015 -]
Title: 2ZR-FXE (ENGINE CONTROL): SFI SYSTEM: P261A12,P261A14; Coolant Pump "B" Circuit Short to Battery; 2016 - 2019 MY Prius [11/2015 -]		

DTC	**P261A12**	**Coolant Pump "B" Circuit Short to Battery**

DTC	**P261A14**	**Coolant Pump "B" Circuit Short to Ground or Open**

DESCRIPTION

Refer to DTC P148F00.

Click here INFO

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	MEMORY	NOTE
P261A12	Coolant Pump "B" Circuit Short to Battery	Engine water pump assembly output voltage is higher than the threshold while the engine water pump assembly is operating (1 trip detection logic).	• Open or short in engine water pump assembly circuit • Engine water pump assembly • ENG W/PMP relay • ECM	Comes on	DTC stored	• SAE Code: P261D • DTC for Mexico Models: Applies
P261A14	Coolant Pump "B" Circuit Short to Ground or Open	Engine water pump assembly output voltage is less than the threshold while the engine water pump assembly is operating (1 trip detection logic).	• Short in engine water pump assembly circuit • Engine water pump assembly • ENG W/PMP relay • ECM	Comes on	DTC stored	• SAE Code: P261C • DTC for Mexico Models: Applies

MONITOR DESCRIPTION

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

MONITOR STRATEGY

Related DTCs	P261C: Engine water pump circuit range check (Low voltage) P261D: Engine water pump circuit range check (High voltage)
Required Sensors/Components (Main)	Engine water pump assembly
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	3 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not stored	None
All of the following conditions are met	-
Auxiliary battery voltage	8 V or higher
Power switch	On (IG)
Time after power switch off to on (IG)	0.5 seconds or more
Output duty cycle	30 to 85%
Engine water pump circuit performance fail (P261B)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

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

Both of the following conditions are met	-
Engine water pump assembly output terminal voltage	Low
Engine water pump assembly output signal	No signal

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

Both of the following conditions are met	-
Engine water pump assembly output terminal voltage	High
Engine water pump assembly output signal	No signal

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.

2. Turn the power switch on (IG).
3. Turn the Techstream on.
4. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
5. Turn the power switch off and wait for at least 30 seconds.
6. Turn the power switch on (IG).
7. Turn the Techstream on.
8. Put the engine in Inspection Mode (Maintenance Mode).

   Click here INFO INFO

9. Start the engine and warm it up until the engine coolant temperature is 75°C (167°F) or higher.
10. Idle the engine for 20 seconds or more [A].
11. Enter the following menus: Powertrain / Engine / Trouble Codes [B].
12. Read the pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.

13. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
14. Input the DTC: P261A12 or P261A14.
15. 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
N/A	◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

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

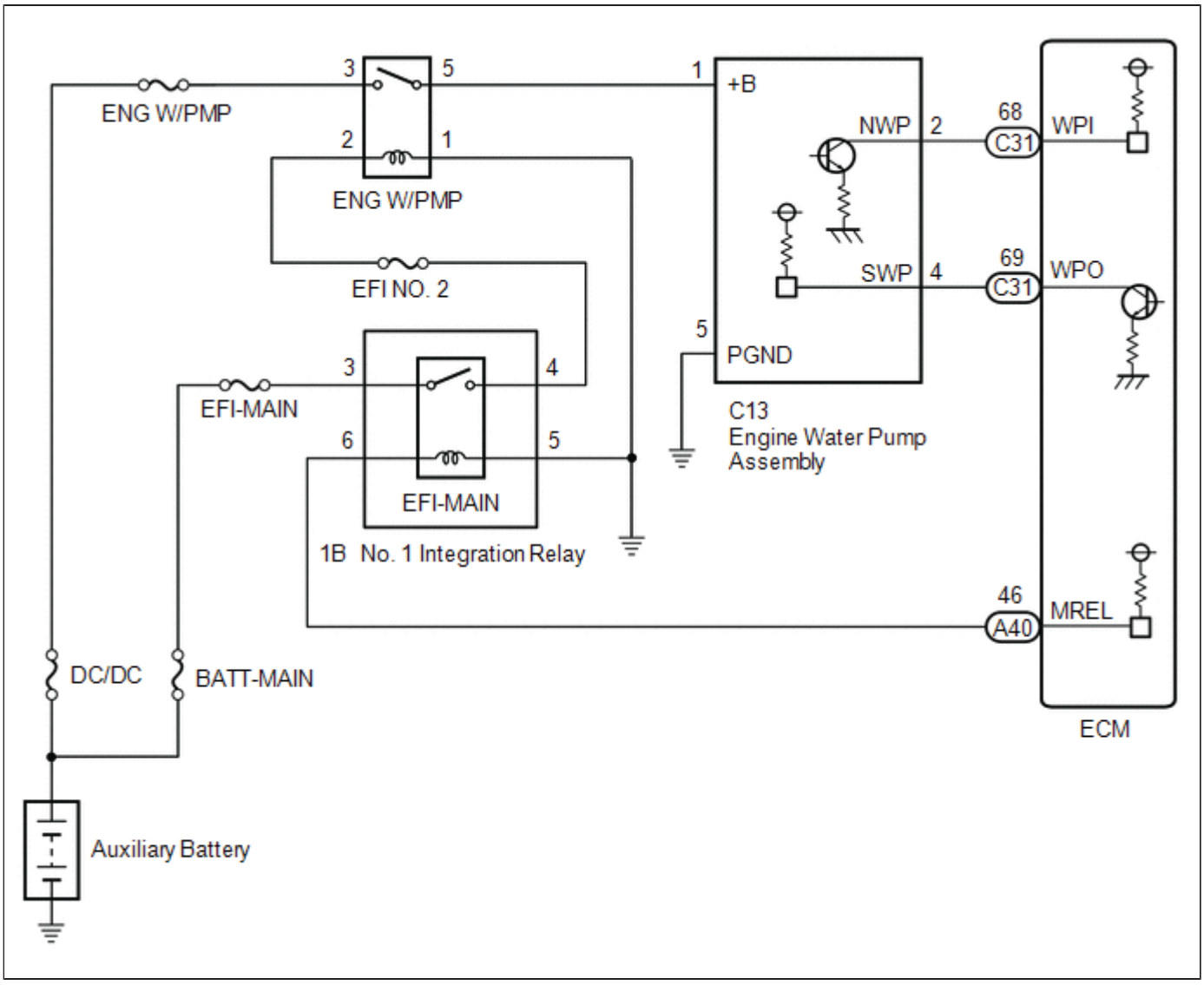
16. If no pending DTCs are output, perform a universal trip and check for permanent DTCs.

    Click here INFO

HINT:

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

WIRING DIAGRAM



CAUTION / NOTICE / HINT

NOTICE:

- Inspect the fuses for circuits related to this system before performing the following procedure.
- Vehicle Control History may be stored in the hybrid vehicle control ECU if the engine is malfunctioning. Certain vehicle condition information is recorded when Vehicle Control History is stored. Reading the vehicle conditions recorded in both the freeze frame data and Vehicle Control History can be useful for troubleshooting.

  - for Nickel Metal Hydride Battery: Click here INFO INFO INFO

  - for Lithium-ion Battery: Click here INFO INFO INFO

  (Select Powertrain in Health Check and then check the time stamp data.)

  Click here INFO
- If any "Engine Malfunction" Vehicle Control History item has been stored in the hybrid vehicle control ECU, make sure to clear it. However, as all Vehicle Control History items are cleared simultaneously, if any Vehicle Control History items other than "Engine Malfunction" are stored, make sure to perform any troubleshooting for them before clearing Vehicle Control History.

  - for Nickel Metal Hydride Battery: Click here INFO INFO INFO

  - for Lithium-ion Battery: Click here INFO INFO INFO

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.	**INSPECT RELAY (ENG W/PMP RELAY)**

(a) Inspect the ENG W/PMP relay.

Click here INFO

NG ▶ **REPLACE RELAY (ENG W/PMP RELAY)**

OK ▼

2.	**CHECK TERMINAL VOLTAGE (POWER SOURCE OF ENGINE WATER PUMP ASSEMBLY)**

HINT:

Make sure that the connector is properly connected. If it is not, securely connect it and check for DTCs again.

(a) Disconnect the engine 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:

EWD INFO

Click Location & Routing(C13)
Click Connector(C13)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C13-1 (+B) - Body ground	Power switch on (IG)	11 to 14 V

NG ▶ **GO TO STEP 7**

OK ▼

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

HINT:

Make sure that the connector is properly connected. If it is not, securely connect it and check for DTCs again.

(a) Disconnect the engine water pump assembly connector.

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

Standard Resistance:

Click Location & Routing(C13)
Click Connector(C13)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C13-5 (PGND) - Body ground	Always	Below 1 Ω

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

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

(a) Disconnect the engine water pump assembly connector.

(b) Disconnect the ECM connector.

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

Standard Resistance:

Click Location & Routing(C13,C31)
Click Connector(C13)
Click Connector(C31)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C13-2 (NWP) - C31-68 (WPI)	Always	Below 1 Ω
C13-4 (SWP) - C31-69 (WPO)	Always	Below 1 Ω
C13-2 (NWP) or C31-68 (WPI) - Body ground and other terminals	Always	10 kΩ or higher
C13-4 (SWP) or C31-69 (WPO) - Body ground and other terminals	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5.	CHECK TERMINAL VOLTAGE (SWP VOLTAGE)

(a) Disconnect the engine 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:

EWD INFO

Click Location & Routing(C13)
Click Connector(C13)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C13-4 (SWP) - Body ground	Power switch on (IG)	Below 1 V

NG ▶ **REPLACE ECM** INFO INFO

OK

6.	INSPECT ECM

(a) Disconnect the engine water pump assembly connector.

(b) Connect the Techstream to the DLC3.

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

(d) Turn the Techstream on.

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

Powertrain > Engine > Active Test

TESTER DISPLAY
Activate the Electric Water Pump

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

Standard Resistance:

EWD INFO

Click Location & Routing(C13)
Click Connector(C13)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C13-4 (SWP) - Body ground	Active Test not being performed → Active Test being performed	Active Test not being performed: The resistance value is stable Active Test being performed: The resistance value fluctuates*

HINT:

- *: Using the Active Test, duty control of the transistors in the ECM will be performed. Due to the duty control, resistance of the WPO terminal of the ECM will be unstable during the Active Test.
- If the resistance is stable when the Active Test is not being performed and fluctuates while the Active Test is being performed, it can be determined that the transistor is operating.
- If the transistor does not operate during the Active Test, the ECM may be malfunctioning.

OK ▶ **REPLACE ENGINE WATER PUMP ASSEMBLY**

NG ▶ **REPLACE ECM** INFO INFO INFO

7.	**CHECK HARNESS AND CONNECTOR (ENG W/PMP RELAY - ENGINE WATER PUMP ASSEMBLY)**

(a) Remove the ENG W/PMP relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Disconnect the engine water pump assembly connector.

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

Standard Resistance:

EWD INFO

Click Location & Routing(C13)
Click Connector(C13)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (ENG W/PMP relay) - C13-1 (+B)	Always	Below 1 Ω
5 (ENG W/PMP relay) or C13-1 (+B) - Body ground and other terminals	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK
▼

8.	CHECK HARNESS AND CONNECTOR (ENG W/PMP RELAY - BODY GROUND)

(a) Remove the ENG W/PMP relay from the No. 1 engine room relay block and No. 1 junction block assembly.

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

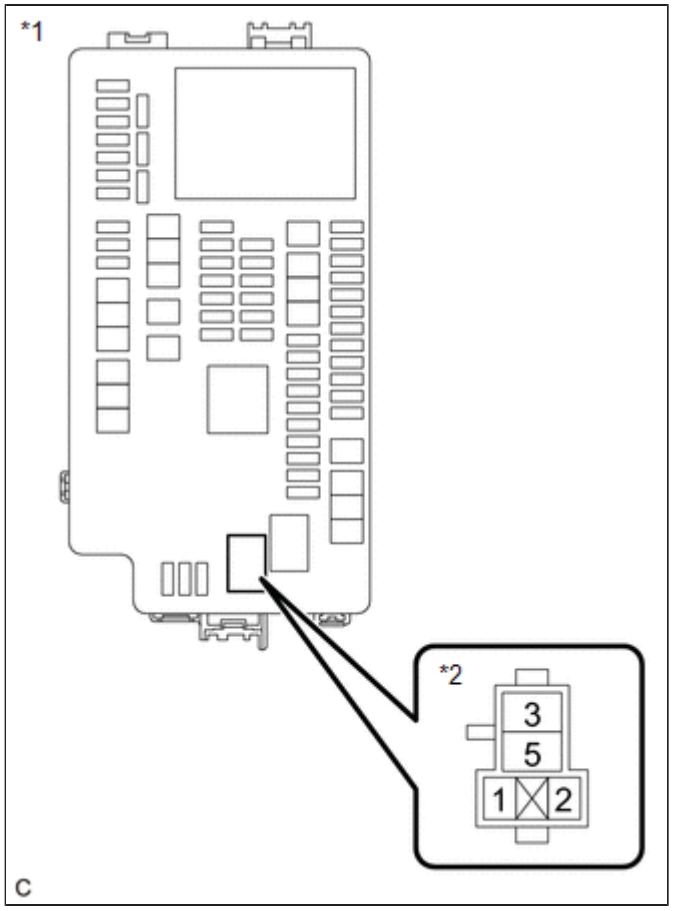
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (ENG W/PMP relay) - Body ground	Always	Below 1 Ω

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

9.	CHECK TERMINAL VOLTAGE (POWER SOURCE OF ENG W/PMP RELAY)



*1	No. 1 Engine Room Relay Block and No. 1 Junction Block Assembly

*2	ENG W/PMP Relay

(a) Remove the ENG W/PMP relay from the No. 1 engine room relay block and No. 1 junction block assembly.

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

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (ENG W/PMP relay) - Body ground	Always	11 to 14 V

OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (NO. 1 INTEGRATION RELAY - ENG W/PMP RELAY)**

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (AUXILIARY BATTERY - ENG W/PMP RELAY)**

Last Modified: 01-14-2019	6.8:8.0.48	**Doc ID:** RM100000000RLHT
Model Year Start: 2016	**Model:** Prius	**Prod Date Range:** [11/2015 -]
Title: 2ZR-FXE (ENGINE CONTROL): SFI SYSTEM: P261A13; Coolant Pump "B" Circuit Open; 2016 - 2019 MY Prius [11/2015 -]		

DTC	**P261A13**	**Coolant Pump "B" Circuit Open**

DESCRIPTION

Refer to DTC P148F00.

Click here INFO

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	MEMORY	NOTE
P261A13	Coolant Pump "B" Circuit Open	Engine water pump assembly speed is less than the threshold while the engine water pump assembly is operating (1 trip detection logic).	• Open or short in engine water pump assembly circuit • Engine water pump assembly • ENG W/PMP relay • ECM	Comes on	DTC stored	• SAE Code: P261B • DTC for Mexico Models: Applies

MONITOR DESCRIPTION

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

MONITOR STRATEGY

Related DTCs	P261B: Engine water pump circuit performance
Required Sensors/Components (Main)	Engine water pump assembly
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	15 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not stored	None
All of the following conditions are met	-
Auxiliary battery voltage	8 V or higher
Power switch	On (IG)
Time after power switch off to on (IG)	0.5 seconds or more
Output duty cycle	30% or more
Engine coolant temperature	-10°C (14 °F) or higher
Engine coolant temperature sensor circuit fail (P0117, P0118)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

Engine water pump assembly speed	Less than 900 rpm

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the power switch on (IG).
3. Turn the Techstream on.
4. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
5. Turn the power switch off and wait for at least 30 seconds.
6. Turn the power switch on (IG).
7. Turn the Techstream on.
8. Put the engine in Inspection Mode (Maintenance Mode).

   Click here INFO INFO
9. Start the engine and warm it up until the engine coolant temperature is 75°C (167°F) or higher.
10. Idle the engine for 20 seconds or more [A].
11. Enter the following menus: Powertrain / Engine / Trouble Codes [B].
12. Read the pending DTCs.

    HINT:

    - If a pending DTC is output, the system is malfunctioning.
    - If a pending DTC is not output, perform the following procedure.
13. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
14. Input the DTC: P261A13.
15. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	◦ DTC judgment completed ◦ System normal
ABNORMAL	◦ DTC judgment completed ◦ System abnormal
	◦ DTC judgment not completed

INCOMPLETE	◦ Perform driving pattern after confirming DTC enabling conditions
N/A	◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

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

16. If no pending DTCs are output, perform a universal trip and check for permanent DTCs.

Click here INFO

HINT:

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

WIRING DIAGRAM

Refer to DTC P261A12.

Click here INFO

CAUTION / NOTICE / HINT

NOTICE:

- Inspect the fuses for circuits related to this system before performing the following procedure.
- Vehicle Control History may be stored in the hybrid vehicle control ECU if the engine is malfunctioning. Certain vehicle condition information is recorded when Vehicle Control History is stored. Reading the vehicle conditions recorded in both the freeze frame data and Vehicle Control History can be useful for troubleshooting.

  - for Nickel Metal Hydride Battery: Click here INFO INFO INFO

  - for Lithium-ion Battery: Click here INFO INFO INFO

  (Select Powertrain in Health Check and then check the time stamp data.)

  Click here INFO
- If any "Engine Malfunction" Vehicle Control History item has been stored in the hybrid vehicle control ECU, make sure to clear it. However, as all Vehicle Control History items are cleared simultaneously, if any Vehicle Control History items other than "Engine Malfunction" are stored, make sure to perform any troubleshooting for them before clearing Vehicle Control History.

  - for Nickel Metal Hydride Battery: Click here INFO INFO INFO

  - for Lithium-ion Battery: Click here INFO INFO INFO

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.	**INSPECT RELAY (ENG W/PMP RELAY)**

(a) Inspect the ENG W/PMP relay.

Click here INFO

NG ▶ **REPLACE RELAY (ENG W/PMP RELAY)**

OK
▼

2.	**CHECK TERMINAL VOLTAGE (POWER SOURCE OF ENGINE WATER PUMP ASSEMBLY)**

HINT:

Make sure that the connector is properly connected. If it is not, securely connect it and check for DTCs again.

(a) Disconnect the engine 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:

EWD INFO

Click Location & Routing(C13)
Click Connector(C13)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C13-1 (+B) - Body ground	Power switch on (IG)	11 to 14 V

NG ▶ **GO TO STEP 6**

OK
▼

3.	**CHECK HARNESS AND CONNECTOR (ENGINE WATER PUMP ASSEMBLY - BODY GROUND)**

HINT:

Make sure that the connector is properly connected. If it is not, securely connect it and check for DTCs again.

(a) Disconnect the engine water pump assembly connector.

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

Standard Resistance:

EWD INFO

Click Location & Routing(C13)
Click Connector(C13)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C13-5 (PGND) - Body ground	Always	Below 1 Ω

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▼

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

(a) Disconnect the engine water pump assembly connector.

(b) Disconnect the ECM connector.

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

Standard Resistance:

EWD INFO

Click Location & Routing(C13,C31)
Click Connector(C13)
Click Connector(C31)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C13-2 (NWP) - C31-68 (WPI)	Always	Below 1 Ω
C13-4 (SWP) - C31-69 (WPO)	Always	Below 1 Ω
C13-2 (NWP) or C31-68 (WPI) - Body ground and other terminals	Always	10 kΩ or higher
C13-4 (SWP) or C31-69 (WPO) - Body ground and other terminals	Always	10 kΩ or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▼

5.	CHECK HARNESS AND CONNECTOR (NWP VOLTAGE)

(a) Disconnect the engine 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:

EWD INFO

Click Location & Routing(C13)
Click Connector(C13)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C13-2 (NWP) - Body ground	Power switch on (IG)	11 to 14 V

OK ▶ REPLACE ENGINE WATER PUMP ASSEMBLY

NG ▶ REPLACE ECM INFO INFO INFO

6.	CHECK HARNESS AND CONNECTOR (ENG W/PMP RELAY - ENGINE WATER PUMP ASSEMBLY)

(a) Remove the ENG W/PMP relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Disconnect the engine water pump assembly connector.

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

Standard Resistance:

EWD INFO

Click Location & Routing(C13)
Click Connector(C13)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (ENG W/PMP relay) - C13-1 (+B)	Always	Below 1 Ω
5 (ENG W/PMP relay) or C13-1 (+B) - Body ground and other terminals	Always	10 kΩ or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▼

7.	CHECK HARNESS AND CONNECTOR (ENG W/PMP RELAY - BODY GROUND)

(a) Remove the ENG W/PMP relay from the No. 1 engine room relay block and No. 1 junction block assembly.

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

Standard Resistance:

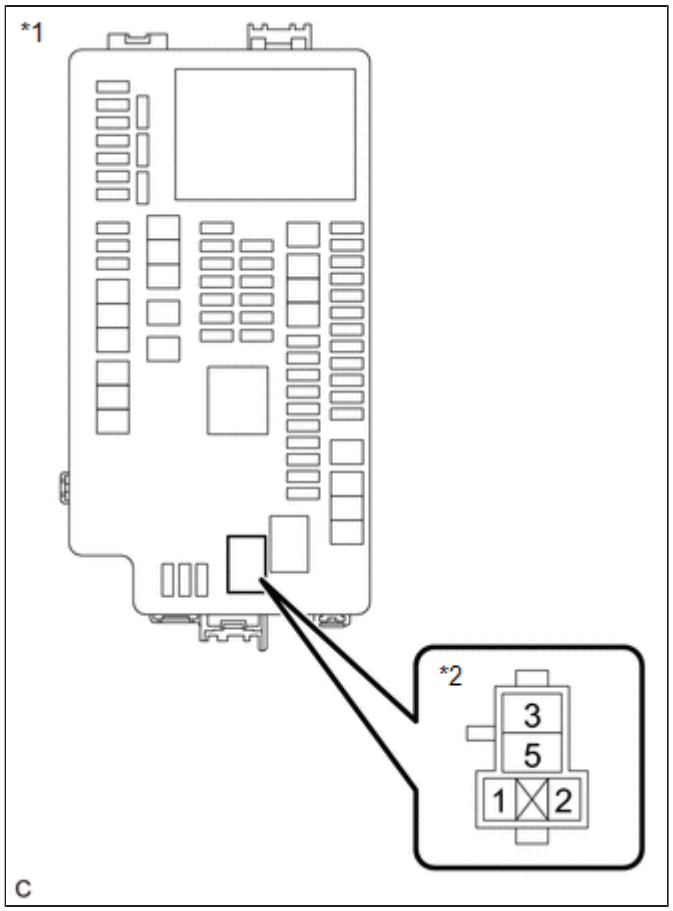
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (ENG W/PMP relay) - Body ground	Always	Below 1 Ω

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

▼

8.	CHECK TERMINAL VOLTAGE (POWER SOURCE OF ENG W/PMP RELAY)



*1	No. 1 Engine Room Relay Block and No. 1 Junction Block Assembly
*2	ENG W/PMP Relay

(a) Remove the ENG W/PMP relay from the No. 1 engine room relay block and No. 1 junction block assembly.

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

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (ENG W/PMP relay) - Body ground	Always	11 to 14 V

OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (NO. 1 INTEGRATION RELAY - ENG W/PMP RELAY)**

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (AUXILIARY BATTERY - ENG W/PMP RELAY)**