Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BLWQ
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P040318,P040319,P140018,P140019; Exhaust Gas Recirculation "A" Circuit Current Below Threshold; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P040318**	**Exhaust Gas Recirculation "A" Circuit Current Below Threshold**

DTC	**P040319**	**Exhaust Gas Recirculation "A" Circuit Current Above Threshold**

DTC	**P140018**	**Exhaust Gas Recirculation "A" Control Circuit 2 Circuit Current Below Threshold**

DTC	**P140019**	**Exhaust Gas Recirculation "A" Control Circuit 2 Circuit Current Above Threshold**

DESCRIPTION

Refer to DTC P040000.

Click here INFO

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P040318	Exhaust Gas Recirculation "A" Circuit Current Below Threshold	Open or short in EGR A circuit for 1 second or more (1 trip detection logic).	• Open or short in EGR valve assembly circuit • EGR valve assembly • ECM	Comes on	Engine	A	SAE Code: P0489
P040319	Exhaust Gas Recirculation "A" Circuit Current Above Threshold	Short in EGR A circuit for 1 second or more (1 trip detection logic).	• Short in EGR valve assembly circuit • EGR valve assembly • ECM	Comes on	Engine	A	SAE Code: P0490

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P140018	Exhaust Gas Recirculation "A" Control Circuit 2 Circuit Current Below Threshold	Open or short in EGR B circuit for 1 second or more (1 trip detection logic).	• Open or short in EGR valve assembly circuit • EGR valve assembly • ECM	Comes on	Engine	A	SAE Code: P0489
P140019	Exhaust Gas Recirculation "A" Control Circuit 2 Circuit Current Above Threshold	Short in EGR B circuit for 1 second or more (1 trip detection logic).	• Short in EGR valve assembly circuit • EGR valve assembly • ECM	Comes on	Engine	A	SAE Code: P0490

MONITOR DESCRIPTION

These DTCs are stored if an open or short in the EGR valve assembly circuit is detected.

Example:

- If the EGA+, EGA-, EGB+ or EGB- operation signal is off, but the step motor output signal is on, the ECM determines that there is a short in the EGR valve assembly circuit, and stores a DTC P040319 or P140019.
- If the EGA+, EGA-, EGB+ or EGB- operation signal is on, and the step motor output signal is off, the ECM determines that there is an open or short in the EGR valve assembly circuit, and stores a DTC P040318 or P140018.

MONITOR STRATEGY

Related DTCs	P0489: EGR A circuit range check (low voltage) P0489: EGR B circuit range check (low voltage) P0490: EGR A circuit range check (high current) P0490: EGR B circuit range check (high current)
Required Sensors/Components (Main)	EGR valve assembly
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	1 second
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Both of the following conditions are met	-
Auxiliary battery voltage	10.5 V or higher
Time after ignition switch off to ON	0.5 seconds or more

P0489: EGR A Circuit Range Check (Low Voltage)

Exhaust gas recirculation control circuit motor phase A high current fail (P0490)	Not detected

P0489: EGR B Circuit Range Check (Low Voltage)

Exhaust gas recirculation control circuit motor phase B high current fail (P0490)	Not detected

P0490: EGR A Circuit Range Check (High Current)

Exhaust gas recirculation control circuit motor phase A low voltage fail (P0489)	Not detected

P0490: EGR B Circuit Range Check (High Current)

Exhaust gas recirculation control circuit motor phase B low voltage fail (P0489)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P0489: EGR A Circuit Range Check (Low Voltage)

Either of the following conditions is met	-
Motor phase A positive terminal voltage detected by motor driver IC	0.2 V or less
Motor phase A negative terminal voltage detected by motor driver IC	0.2 V or less

P0489: EGR B Circuit Range Check (Low Voltage)

Either of the following conditions is met	-
Motor phase B positive terminal voltage detected by motor driver IC	0.2 V or less
Motor phase B negative terminal voltage detected by motor driver IC	0.2 V or less

P0490: EGR A Circuit Range Check (High Current)

One of the following conditions is met	-
Motor phase A positive terminal current detected by motor driver IC	1.2 A or more
Motor driver MOSFET temperature for motor phase A positive terminal detected by motor driver IC	150°C (302°F) or higher
Motor phase A negative terminal current detected by motor driver IC	1.2 A or more
Motor driver MOSFET temperature for motor phase A negative terminal detected by motor driver IC	150°C (302°F) or higher

P0490: EGR B Circuit Range Check (High Current)

One of the following conditions is met	-
Motor phase B positive terminal current detected by motor driver IC	1.2 A or more
Motor driver MOSFET temperature for motor phase B positive terminal detected by motor driver IC	150°C (302°F) or higher
Motor phase B negative terminal current detected by motor driver IC	1.2 A or more
Motor driver MOSFET temperature for motor phase B negative terminal detected by motor driver IC	150°C (302°F) or higher

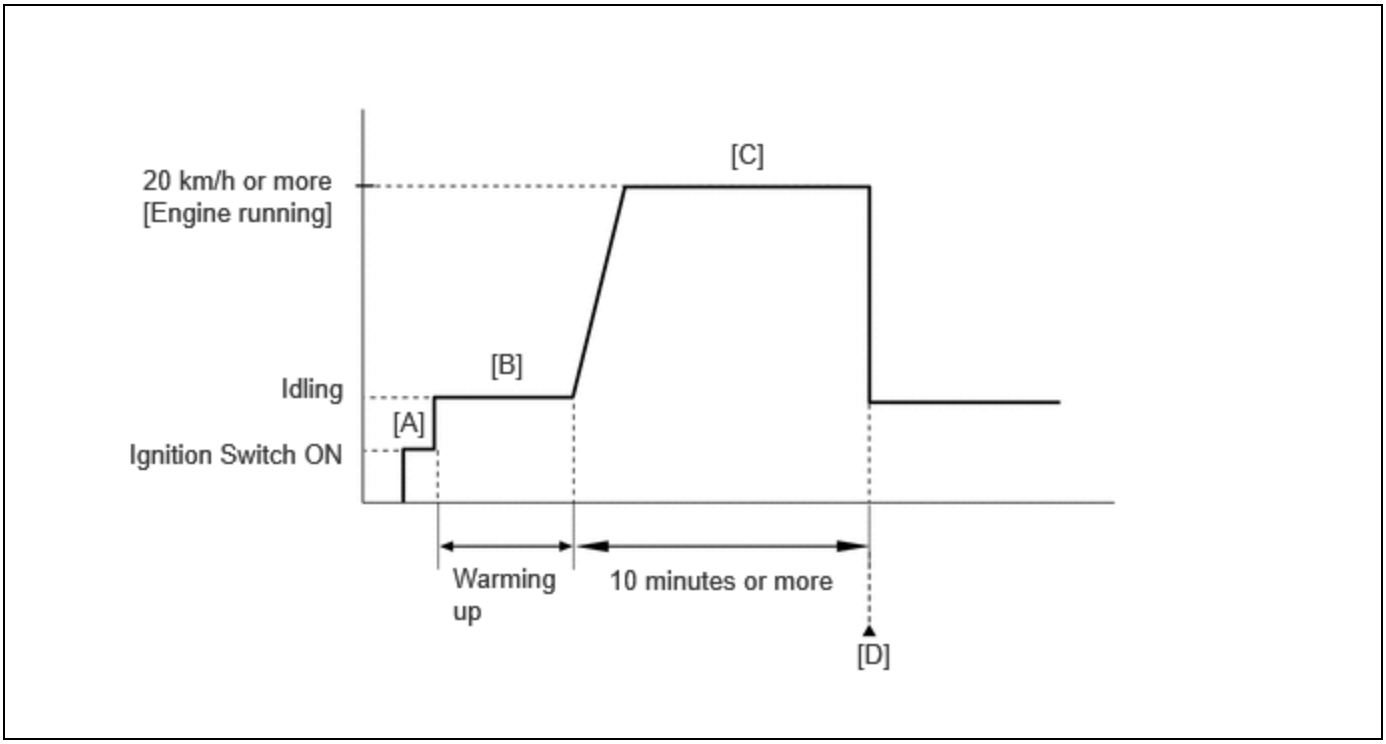
CONFIRMATION DRIVING PATTERN

HINT:

- After repair has been completed, clear the DTC and then check that the vehicle has returned to normal by performing the following All Readiness check procedure.

  Click here INFO
- When clearing the permanent DTCs, refer to the "CLEAR PERMANENT DTC" procedure.

  Click here INFO



1. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
2. Turn the ignition switch off and wait for at least 30 seconds.
3. Turn the ignition switch to ON [A].
4. Put the engine in Inspection Mode (Maintenance Mode).

   Click here INFO
5. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher [B].
6. Press the EV/HV mode selection switch to select HV mode. (for PHEV Model)
7. With the engine running, drive the vehicle at 20 km/h (12 mph) or more for 10 minutes or more [C].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

HINT:

If the engine stops, further depress the accelerator pedal to restart the engine.

8. Enter the following menus: Powertrain / Engine / Trouble Codes [D].
9. 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.

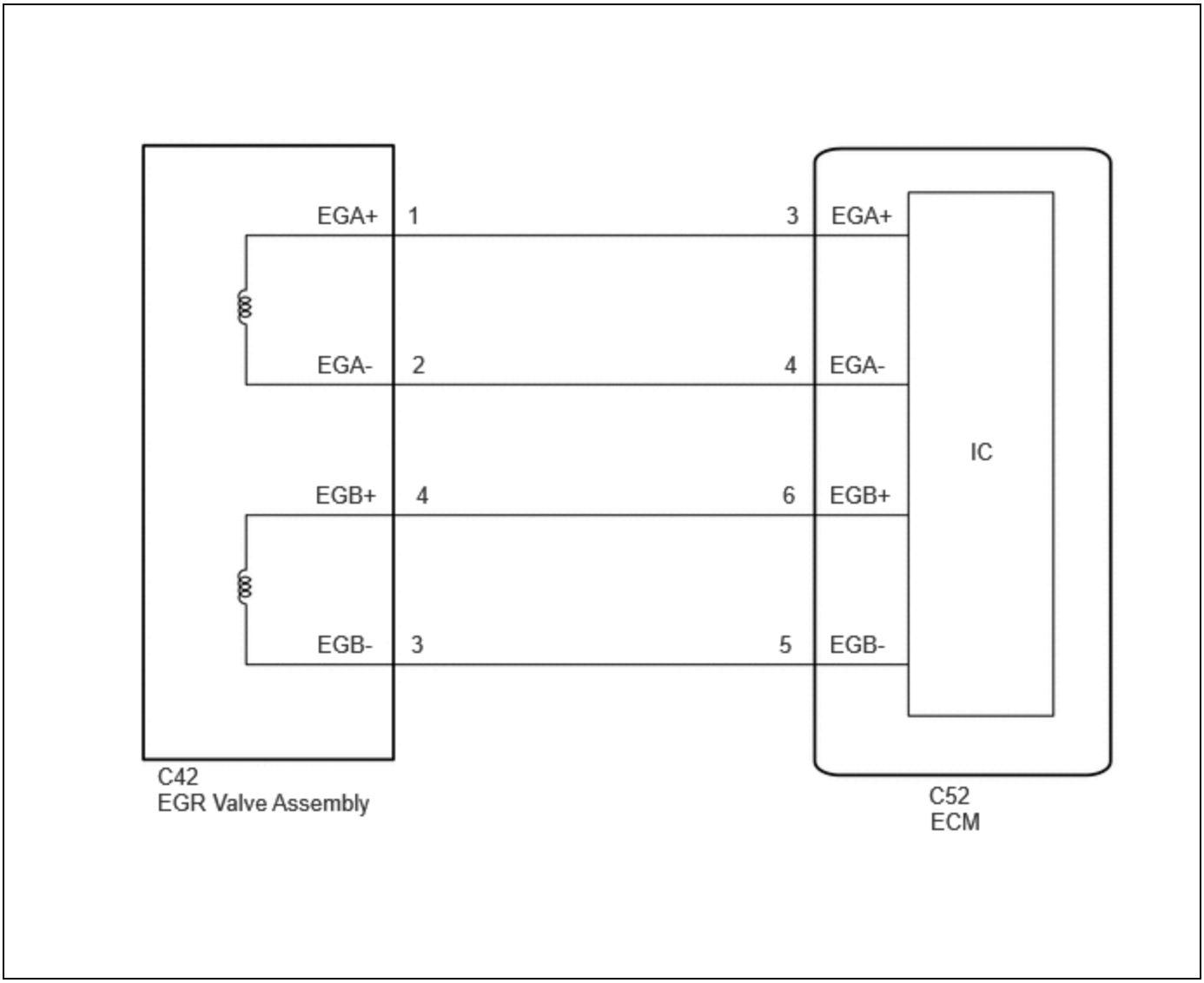
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P040318, P040319, P140018 or P140019.
12. Check the DTC judgment result.

HINT:

- If the judgment result is NORMAL, the system is normal.
- If the judgment result is ABNORMAL, the system is malfunctioning.
- [A] to [D]: Normal judgment procedure.

  The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.
- When clearing the permanent DTCs, do not disconnect the cable from the auxiliary battery terminal or attempt to clear the DTCs during this procedure, as doing so will clear the universal trip and normal judgment histories.

WIRING DIAGRAM



CAUTION / NOTICE / HINT

NOTICE:

- 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 HEV Model: Click here INFO

  for PHEV Model: Click here INFO

  (Select Powertrain in Health Check and then check the time stamp data.)
- 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 HEV Model: Click here INFO

  for PHEV Model: Click here INFO

PROCEDURE

1.	**PERFORM ACTIVE TEST USING GTS (CONTROL THE EGR STEP POSITION)**

Pre-procedure1

(a) Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.

HINT:

The A/C switch and all accessory switches should be off.

Procedure1

(b) Confirm that the value of Data List item Engine Independent is "Operate" then check the value of Intake Manifold Absolute Pressure while performing the Active Test.

Powertrain > Engine > Active Test

ACTIVE TEST DISPLAY
Control the EGR Step Position

DATA LIST DISPLAY
Intake Manifold Absolute Pressure
Coolant Temperature
Engine Independent

NOTICE:

- Make sure that the value of Data List item Engine Independent is "Operate" while performing the Active Test.
- Do not leave the EGR valve open for 10 seconds or more during the Active Test.
- Be sure to return the EGR valve to step 0 when the Active Test is completed.
- Do not open the EGR valve 30 steps or more during the Active Test.

OK:

The value of Intake Manifold Absolute Pressure changes in response to the EGR step position when the value of Engine Independent is "Operate".

Standard:

-	CONTROL THE EGR STEP POSITION (ACTIVE TEST)	
	0 STEPS	0 TO 30 STEPS
Intake Manifold Absolute Pressure (Data List)	(EGR valve is fully closed)	Intake Manifold Absolute Pressure value is at least +10 kPa (1.45 psi) higher than when EGR valve is fully closed

HINT:

- If the value of Data List item Engine Independent is "Not Opr" when the engine is idling, charge control is being performed. Perform the Active Test after charge control is complete ("Operate" is displayed).
- While performing the Active Test, if the increase in the value of Intake Manifold Absolute Pressure is small, the EGR valve assembly may be malfunctioning.

- Even if the EGR valve assembly is malfunctioning, rough idling or an increase in the value of Intake Manifold Absolute Pressure may occur while performing the Active Test. However, the amount that the value of Intake Manifold Absolute Pressure increases will be smaller than normal.

RESULT	PROCEED TO
Intake Manifold Absolute Pressure value is at least +10 kPa (1.45 psi) higher than when EGR valve is fully closed	A
None of the above conditions are met	B

Post-procedure1

(c) None.

A ▶ **CHECK FOR INTERMITTENT PROBLEMS**

B ▼

2.	**INSPECT EGR VALVE ASSEMBLY**

Click here INFO

NG ▶ **REPLACE EGR VALVE ASSEMBLY**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (EGR VALVE ASSEMBLY - ECM)**

Pre-procedure1

(a) Disconnect the EGR valve assembly connector.

(b) Disconnect the ECM connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(C42,C52)

Click Connector(C42)
Click Connector(C52)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C42-1 (EGA+) - C52-3 (EGA+)	Always	Below 1 Ω	Ω
C42-2 (EGA-) - C52-4 (EGA-)	Always	Below 1 Ω	Ω
C42-4 (EGB+) - C52-6 (EGB+)	Always	Below 1 Ω	Ω
C42-3 (EGB-) - C52-5 (EGB-)	Always	Below 1 Ω	Ω
C42-1 (EGA+) or C52-3 (EGA+) - Body ground and other terminals	Always	10 kΩ or higher	kΩ
C42-2 (EGA-) or C52-4 (EGA-) - Body ground and other terminals	Always	10 kΩ or higher	kΩ
C42-4 (EGB+) or C52-6 (EGB+) - Body ground and other terminals	Always	10 kΩ or higher	kΩ
C42-3 (EGB-) or C52-5 (EGB-) - Body ground and other terminals	Always	10 kΩ or higher	kΩ

Post-procedure1

(d) None.

OK ▶ **REPLACE ECM**

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