Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BLX1
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P045011,P045015,P04502F; Evaporative Emission System Pressure Sensor/Switch Circuit Short to Ground; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P045011**	**Evaporative Emission System Pressure Sensor/Switch Circuit Short to Ground**

DTC	**P045015**	**Evaporative Emission System Pressure Sensor/Switch Circuit Short to Battery or Open**

DTC	**P04502F**	**Evaporative Emission System Pressure Sensor/Switch Signal Erratic**

DTC SUMMARY

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P045011	Evaporative Emission System Pressure Sensor/Switch Circuit Short to Ground	EVAP pressure is less than 42.110 kPa(abs) [6.106 psi(abs)] for 0.5 seconds or more.	• Canister pump module • Connector/wire harness (Canister pump module - ECM) • ECM	Comes on	Engine	A	SAE Code: P0452
P045015	Evaporative Emission System Pressure Sensor/Switch Circuit Short to Battery or Open	EVAP pressure is higher than 123.761 kPa(abs) [17.945 psi(abs)] for 0.5 seconds or more.	• Canister pump module • Connector/wire harness (Canister pump module - ECM) • ECM	Comes on	Engine	A	SAE Code: P0453
P04502F	Evaporative Emission System Pressure Sensor/Switch Signal Erratic	Canister pressure sensor output voltage fluctuates frequently for a certain amount of time.	• Canister pump module • Connector/wire harness (Canister pump module - ECM) • EVAP system hose (pipe from air inlet port to canister pump module,	Comes on	Engine	A	SAE Code: P0451

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
			canister filter, fuel tank vent hose) • ECM				

DTC NO.	MONITORING ITEM	DETECTION TIMING	DETECTION LOGIC	SAE CODE
P045011	Canister pressure sensor low input	• Ignition switch ON • EVAP monitoring (ignition switch off)	1 trip	P0452
P045015	Canister pressure sensor high input	• Ignition switch ON • EVAP monitoring (ignition switch off)	1 trip	P0453
P04502F	Canister pressure sensor abnormal voltage fluctuation (Noise monitor)	• EVAP monitoring (ignition switch off) • Engine running	2 trip	P0451

HINT:

The canister pressure sensor is built into the canister pump module.

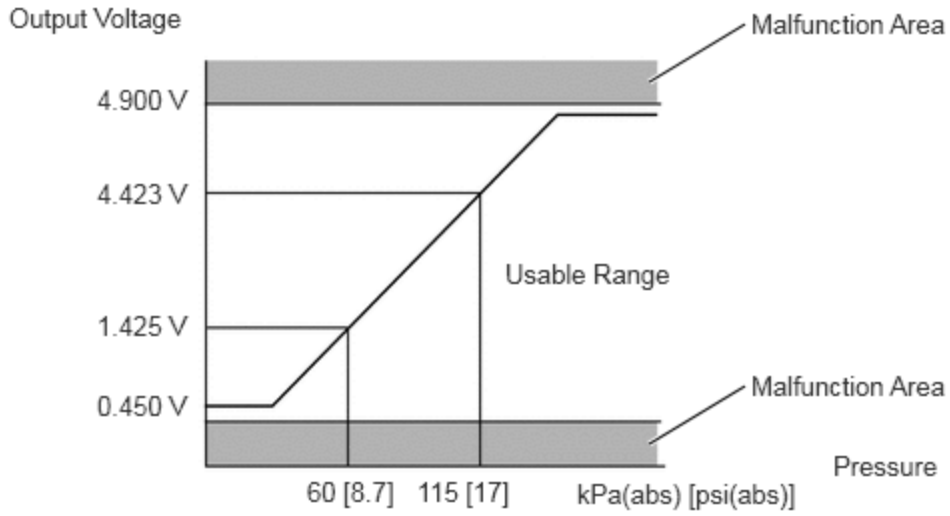
DESCRIPTION

Refer to EVAP (Evaporative Emission) System.

Click here INFO

MONITOR DESCRIPTION

Canister Pressure Sensor Specification:



HINT:

Standard atmospheric pressure is 101.3 kPa(abs) [14.7 psi(abs)]

1. DTC P045011: Canister pressure sensor voltage low

   If the canister pressure sensor output voltage (pressure) is less than 0.45 V: 42.110 kPa(abs) [6.106 psi(abs)], the ECM interprets this as an open or short circuit in the canister pressure sensor or its circuit, and stops the EVAP system monitor. If any deterioration has occurred, the ECM will illuminate the MIL and store this DTC (1 trip detection logic).
2. DTC P045015: Canister pressure sensor voltage high

   If the canister pressure sensor output voltage (pressure) is higher than 4.9 V: 123.761 kPa(abs) [17.945 psi(abs)], the ECM interprets this as an open or short circuit in the canister pressure sensor or its circuit, and stops the EVAP system monitor. If any deterioration has occurred, the ECM will illuminate the MIL and store this DTC (1 trip detection logic).
3. DTC P04502F: Canister pressure sensor abnormal voltage fluctuation (Noise monitor)

   If the canister pressure sensor output voltage fluctuates rapidly for 10 seconds, the ECM stops the EVAP system monitor. The ECM interprets this as the canister pressure sensor voltage fluctuating, and stops the EVAP system monitor. The ECM then illuminates the MIL and stores this DTC (2 trip detection logic).

MONITOR STRATEGY

Required Sensors/Components (Main)	Canister pump module
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.5 seconds: P0452 and P0453 Less than 15 seconds: P0451

MIL Operation	Immediate: P0452 and P0453 2 driving cycles: P0451
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

P0451

Atmospheric pressure	70 kPa(abs) [10.2 psi(abs)] or higher, and less than 110 kPa(abs) [16 psi(abs)]
Auxiliary battery voltage	10.5 V or higher
Intake air temperature	4.4°C (39.9°F) or higher, and less than 50°C (122°F)
Canister pressure sensor malfunction (P0452, P0453)	Not detected
Either of the following conditions is met	A or B
A. Ignition switch	On (READY)
B. Time after key-off	5, 7 or 9.5 hours

P0452 and P0453

Monitor runs whenever the following DTCs are not stored	None
Both of the following conditions are met	-
Either of the following conditions is met	(a) or (b)
(a) Ignition switch	ON
(b) Soak timer	On
Auxiliary battery voltage	8 V or higher

TYPICAL MALFUNCTION THRESHOLDS

P0451: Canister Pressure Sensor Noise Monitoring

Frequency that EVAP pressure change 0.3 kPa [0.04 psi] or higher	10 times or more in 10 seconds

P0452: Canister Pressure Sensor Low Voltage

EVAP system pressure sensor voltage (EVAP pressure)	Less than 0.45 V [Less than 42.110 kPa(abs) (6.106 psi(abs))]

P0453: Canister Pressure Sensor High Voltage

EVAP system pressure sensor voltage (EVAP pressure)	Higher than 4.9 V [Higher than 123.761 kPa(abs) (17.945 psi(abs))]

CONFIRMATION DRIVING PATTERN

NOTICE:

- The Evaporative System Check (Automatic Mode) consists of 9 steps performed automatically by the GTS. It takes a maximum of approximately 40 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not start the engine during this operation.
- When the temperature of the fuel is 35°C (95°F) or higher, a large amount of vapor will form and any check result will be inaccurate. When performing the Evaporative System Check, keep the fuel temperature less than 35°C (95°F).

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

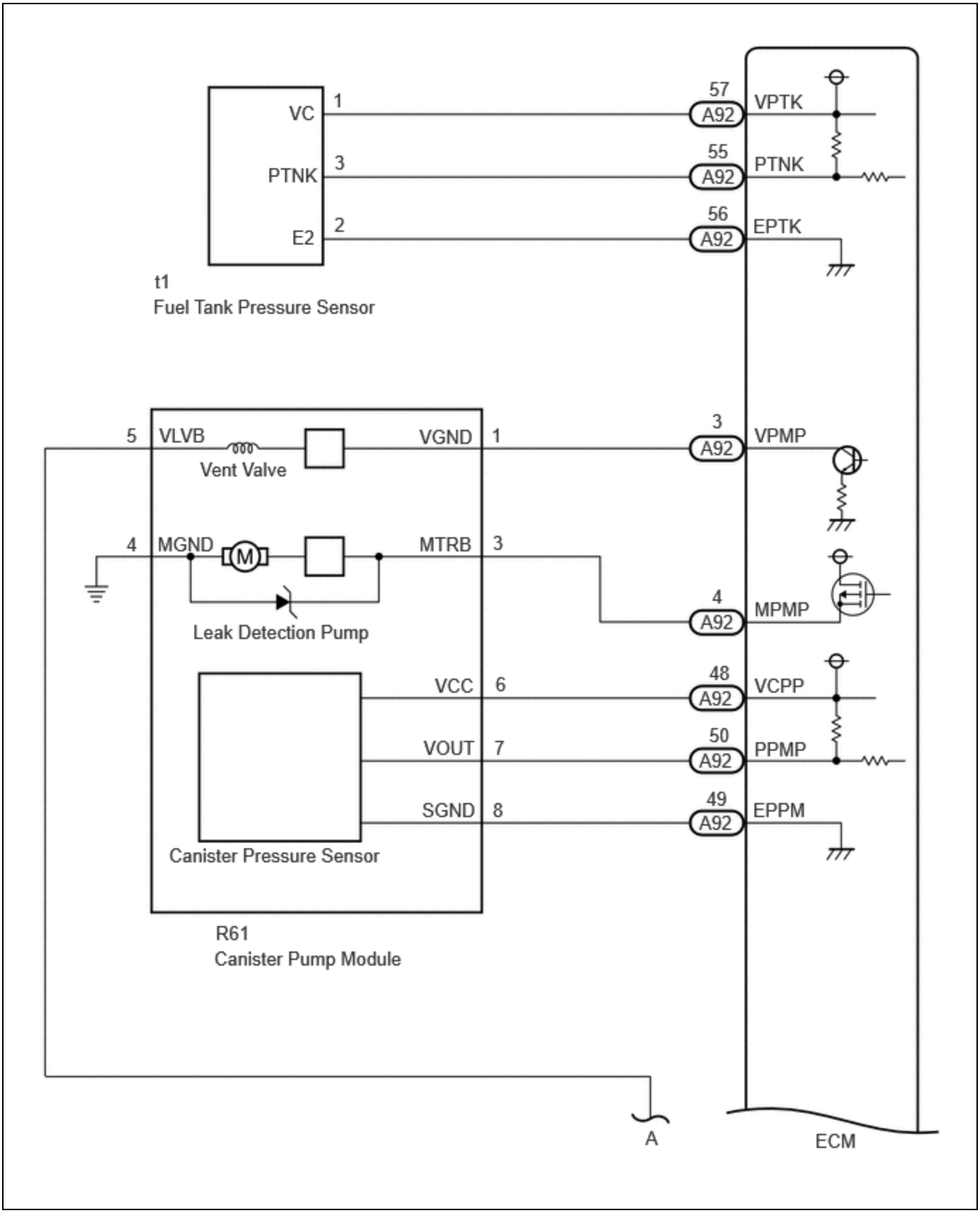
1. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
2. Turn the ignition switch off and wait for at least 30 seconds.
3. Turn the ignition switch to ON [A].
4. Enter the following menus: Powertrain / Engine / Data List / Intake Air Temperature.
5. Check that the intake air temperature is between 4.4 and 50°C (39.9 and 122°F) [B].
6. Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode [C].
7. After the Evaporative System Check is completed, check for All Readiness by entering the following menus: Powertrain / Engine / Utility / All Readiness.
8. Input the DTC: P045011, P045015 or P04502F.
9. Check the DTC judgment result.

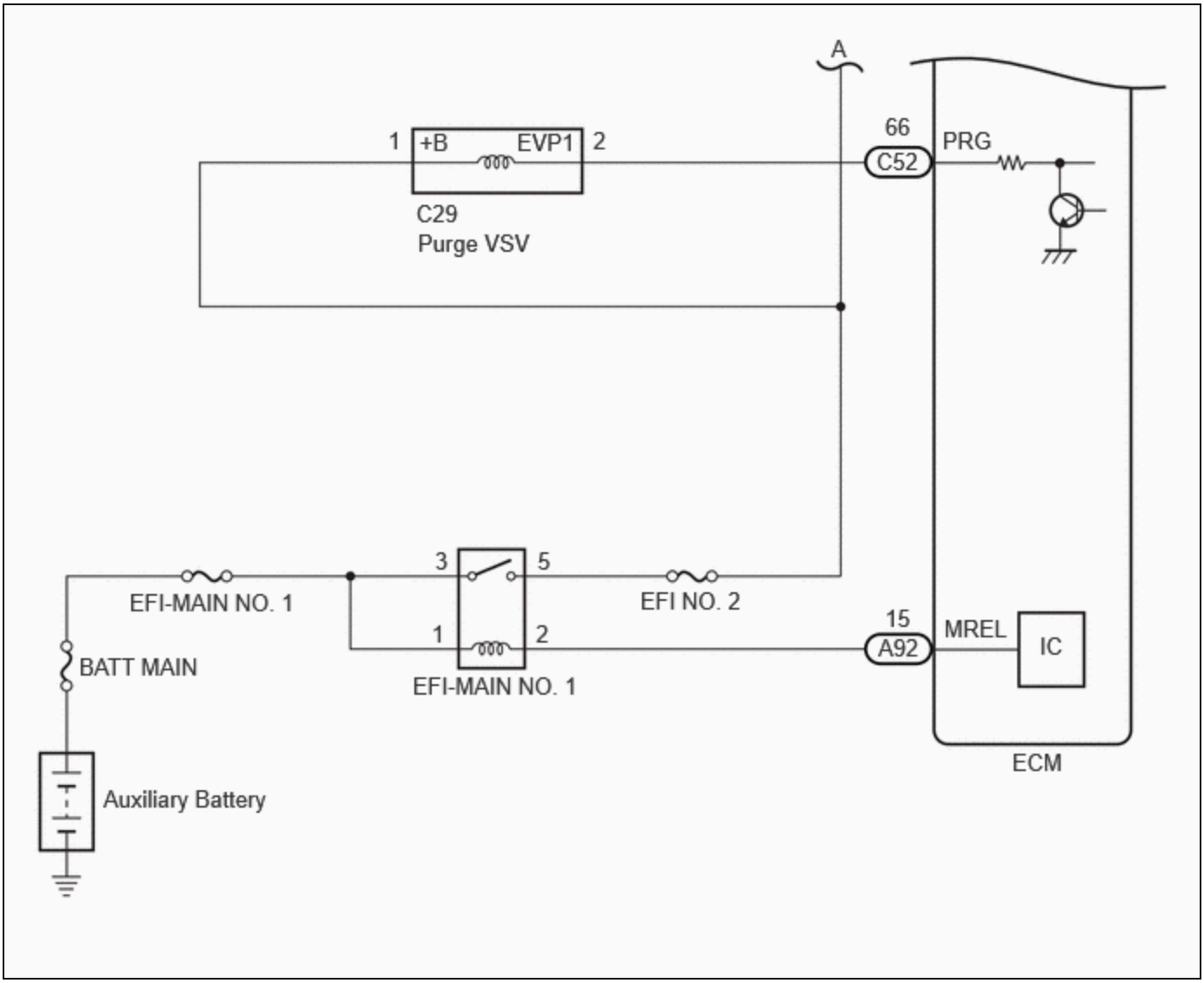
HINT:

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


VC
1
PTNK
3
E2
2
t1
Fuel Tank Pressure Sensor
57
A92
VPTK
55
A92
PTNK
56
A92
EPTK
5
VLVB
VGND
1
Vent Valve
3
A92
VPMP
4
MGND
M
MTRB
3
Leak Detection Pump
4
A92
MPMP
VCC
6
48
A92
VCPP
VOUT
7
50
A92
PPMP
SGND
8
49
A92
EPPM
Canister Pressure Sensor
R61
Canister Pump Module
A
ECM



CAUTION / NOTICE / HINT

NOTICE:

- When a vehicle which has any of these DTCs stored is brought into the workshop, do not change the condition of the vehicle. For example, do not tighten the fuel tank cap assembly.
- The GTS is required to conduct the following diagnostic troubleshooting 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 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.	**CONFIRM DTC AND EVAP PRESSURE**

(a) Read the DTCs.

Powertrain > Engine > Trouble Codes

RESULT	PROCEED TO
P045011 is output	A
P045015 is output	B
P04502F is output	C

DISPLAY (DTC OUTPUT)	DATA LIST DISPLAY (VAPOR PRESSURE PUMP)	SUSPECTED TROUBLE AREA
P045011	Less than 42.110 kPa(abs) [6.106 psi(abs)]	• Wire harness/connector (canister pressure sensor - ECM) • Canister pressure sensor • Short in ECM circuit
P045015	Higher than 123.761 kPa(abs) [17.945 psi(abs)]	• Wire harness/connector (canister pressure sensor - ECM) • Canister pressure sensor • Open in ECM circuit
P04502F	-	Canister pressure sensor

B ▶ **GO TO STEP 5**

C ▶ **GO TO STEP 6**

A ▼

2.	**CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - ECM)**

Pre-procedure1

(a) Disconnect the ECM connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(A92)
Click Connector(A92)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A92-50 (PPMP) - Body ground	Always	Below 10 Ω	Ω

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	SUSPECTED TROUBLE AREA
A92-[50] (PPMP) - Body ground and other terminals	Always	Below 10 Ω	• Wire harness or connector (ECM - canister pressure sensor) • Short in canister pressure sensor circuit
		10 kΩ or higher	• Wire harness or connector (ECM - canister pressure sensor) • Short in ECM circuit

Post-procedure1

(c) None.

NG ▶ **GO TO STEP 4**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - ECM)**

Pre-procedure1

(a) Disconnect the canister pump module 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(A92)
Click Connector(A92)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A92-50 (PPMP) - Body ground	Always	10 kΩ or higher	kΩ

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	SUSPECTED TROUBLE AREA
A92-[50] (PPMP) - Body ground and other terminals	Always	10 kΩ or higher	Short in canister pressure sensor circuit
		Below 10 Ω	Short in wire harness or connector (ECM - canister pressure sensor)

Post-procedure1

(d) None.

OK ▶ **GO TO STEP 6**

NG ▶ **GO TO STEP 7**

4.	**REPLACE ECM**

HINT:

Click here INFO

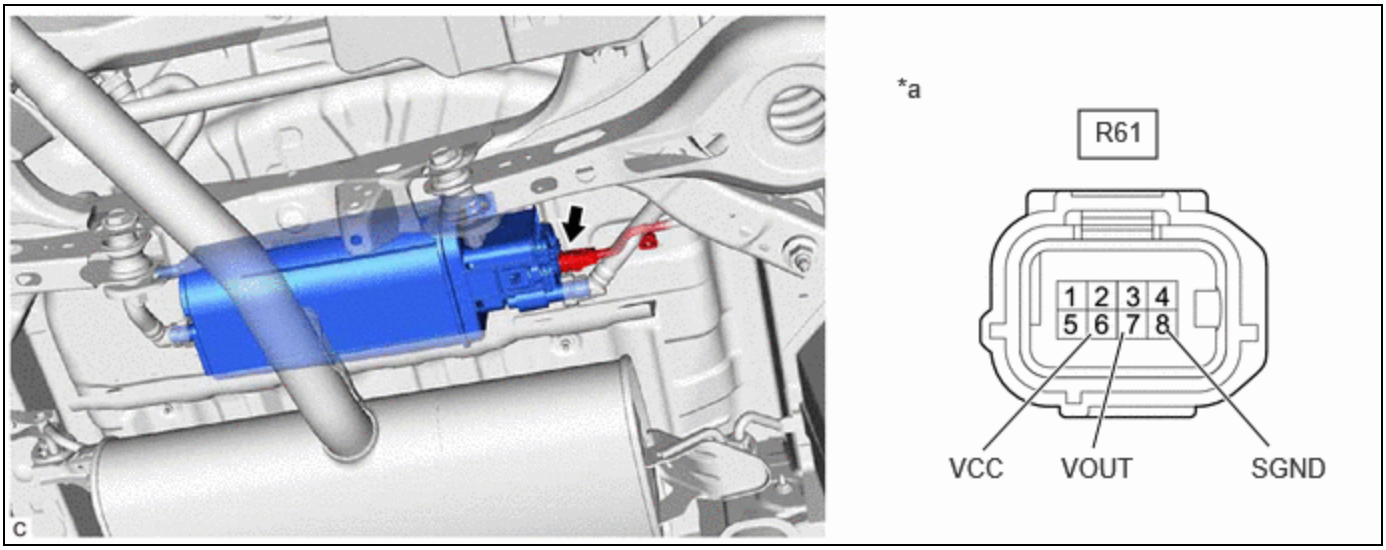
NEXT ▶ **GO TO STEP 8**

5.	**CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - ECM)**

Pre-procedure1

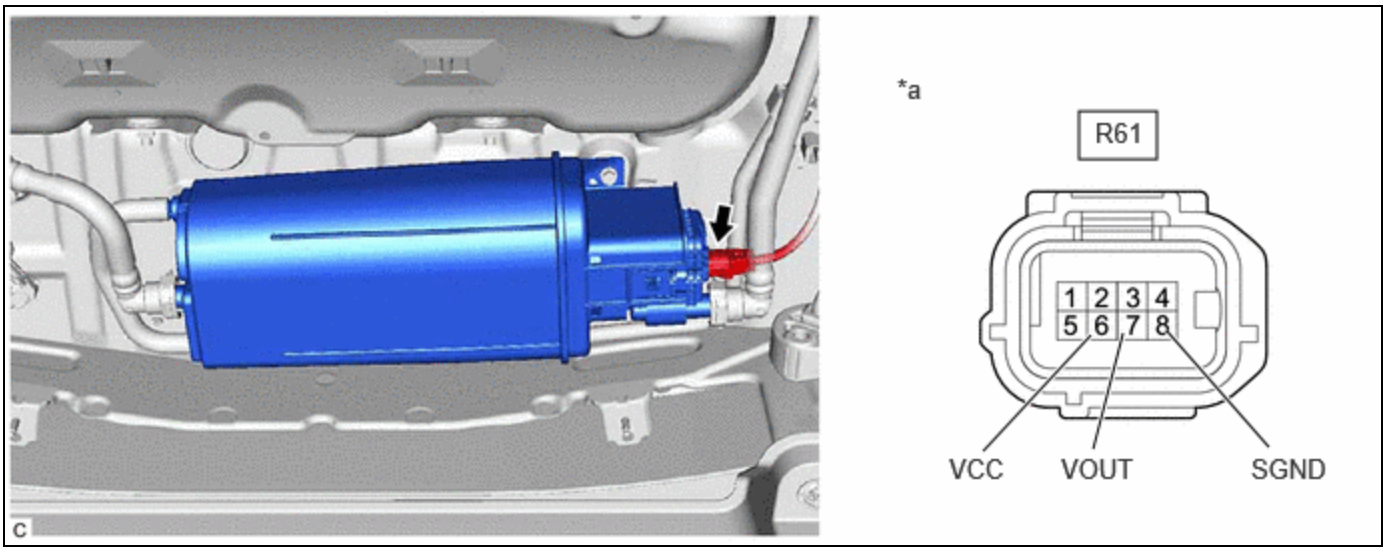
(a) Disconnect the canister pump module connector.

for HEV Model



*a	Front view of wire harness connector (to Canister Pump Module)	-	-

for PHEV Model



*a	Front view of wire harness connector (to Canister Pump Module)	-	-

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(R61)
Click Connector(R61)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
R61-8 (SGND) - Body ground	Always	100 Ω or less	Ω

Post-procedure1

(c) Turn the ignition switch to ON.

Pre-procedure2

(d) None.

Procedure2

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

Standard Voltage:

EWD INFO

Click Location & Routing(R61)
Click Connector(R61)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
R61-6 (VCC) - Body ground	Ignition switch ON	4.5 to 5.5 V	V
R61-7 (VOUT) - Body ground	Ignition switch ON	4.5 to 5.5 V	V

TEST RESULT	SUSPECTED TROUBLE AREA
Voltage and resistance within standard ranges	Open in canister pressure sensor circuit
Voltage and/or resistance outside standard ranges	Open in wire harness or connector (ECM - canister pressure sensor)

Post-procedure2

(f) None.

NG ▶ **GO TO STEP 7**

OK ▼

6.	**REPLACE CANISTER PUMP MODULE**

HINT:

for HEV Model: Click here INFO

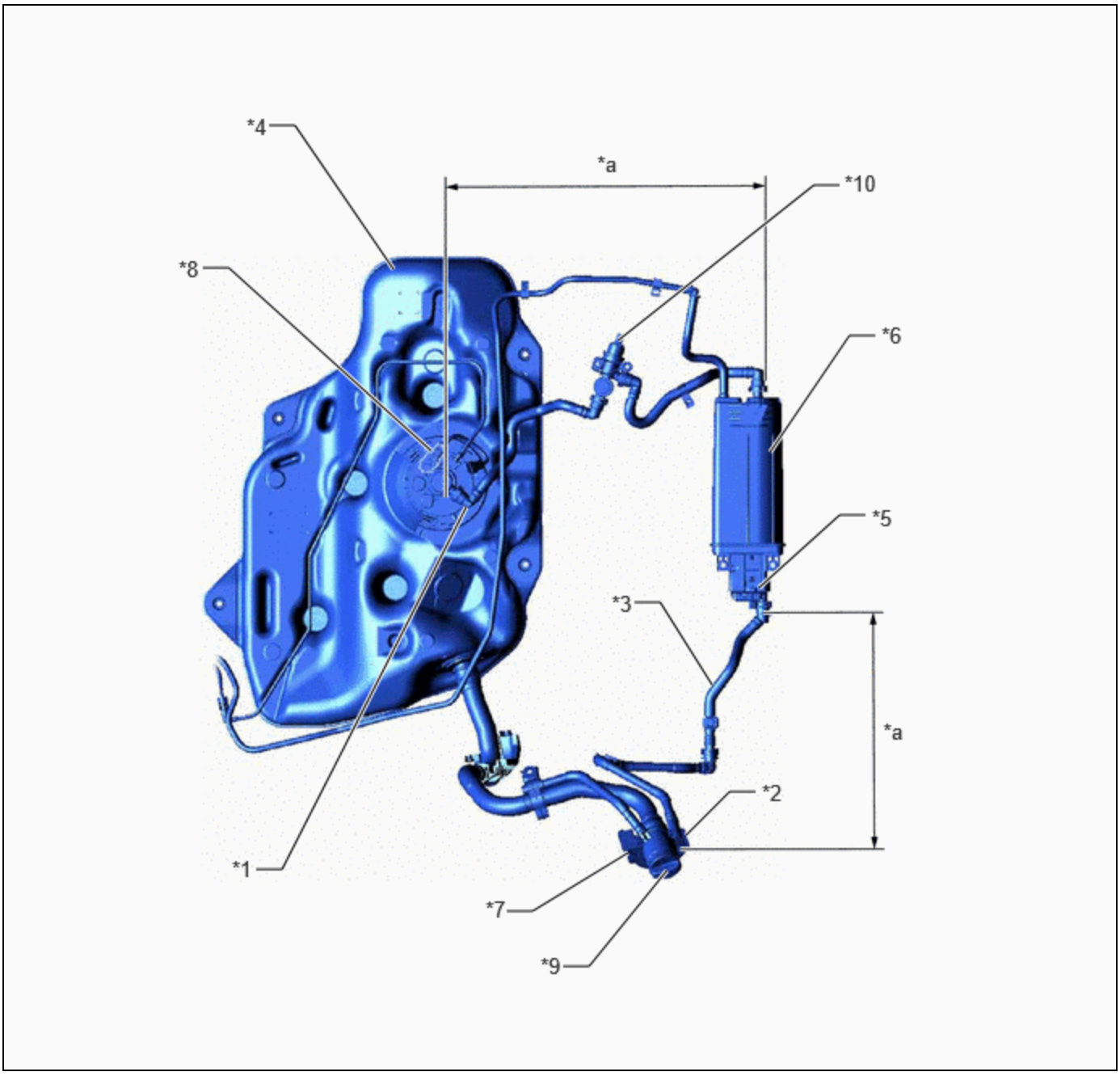
for PHEV Model: Click here INFO

NOTICE:

- When replacing the canister pump module, check the inside of the canister pump module and canister, and related pipes for water, fuel and other liquids. If liquids are present, check for disconnections and/or cracks in the following: 1) the pipe from the air inlet port to the canister pump module; 2) the canister filter; and 3) the fuel tank vent hose. If liquids are present in the inside of the canister, replace the canister and canister pump module.

- Check for filter blockage in the canister. If the charcoal filter inside the canister is clogged, replace the canister and canister pump module.
- Check for filter blockage in the canister filter. If there is blockage in the canister filter, replace the canister filter.

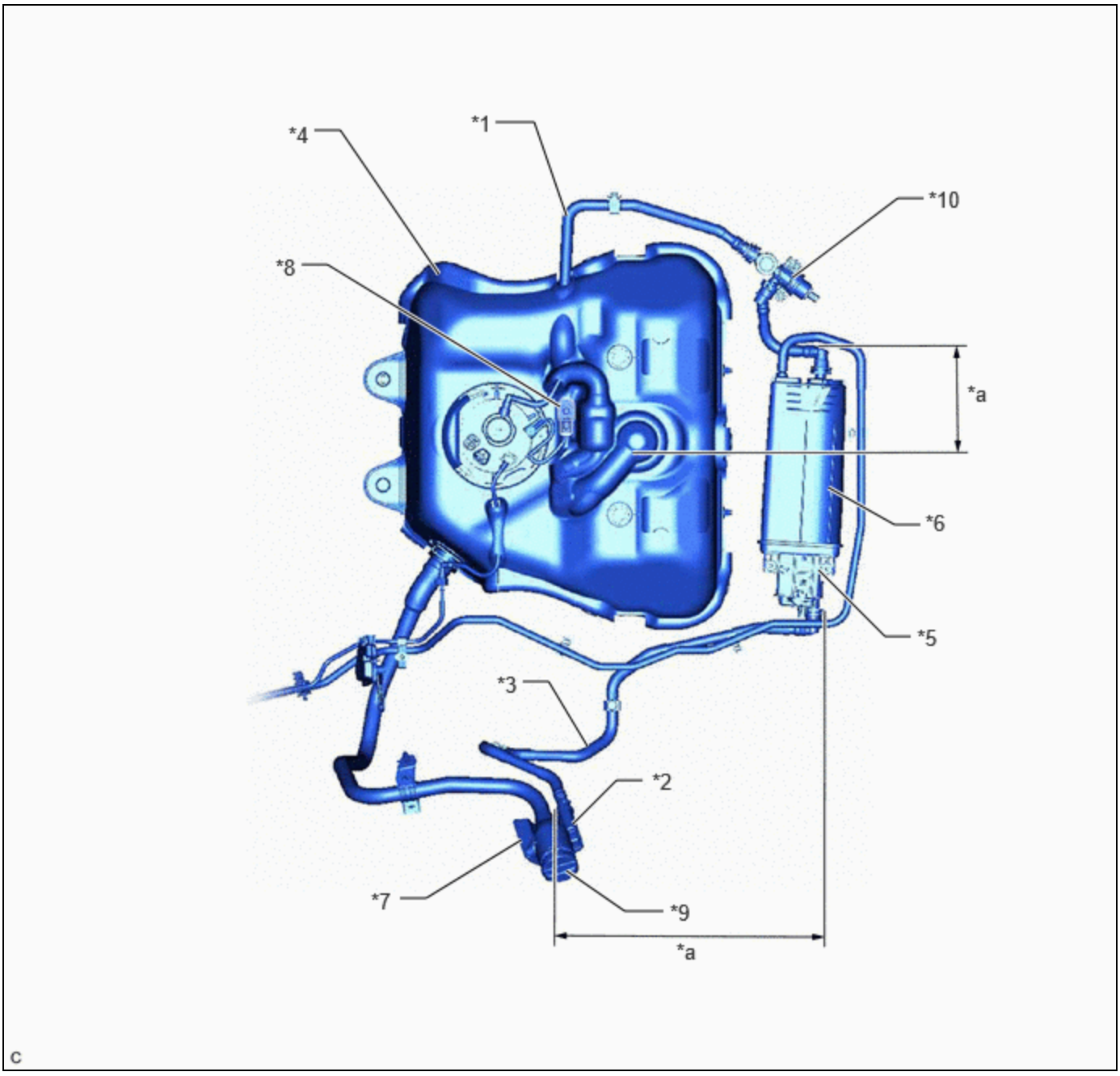
for HEV Model



*1	Fuel Tank Vent Hose	*2	Air Inlet Port
*3	Vent Hose	*4	Fuel Tank
*5	Canister Pump Module • Canister Pressure Sensor • Leak Detection Pump • Vent Valve	*6	Canister
*7	Canister Filter	*8	Fuel Tank Pressure Sensor

*9	Fuel Tank Cap Assembly	*10	Fuel Vapor-containment Valve
*a	Inspection Area (Check for disconnection and/or cracks)	-	-

for PHEV Model



*1	Fuel Tank Vent Hose	*2	Air Inlet Port
*3	Vent Hose	*4	Fuel Tank
*5	Canister Pump Module • Canister Pressure Sensor • Leak Detection Pump • Vent Valve	*6	Canister

*7	Canister Filter	*8	Fuel Tank Pressure Sensor
*9	Fuel Tank Cap Assembly	*10	Fuel Vapor-containment Valve
*a	Inspection Area (Check for disconnection and/or cracks)	-	-

NEXT ▶ **GO TO STEP 8**

7.	**REPAIR OR REPLACE HARNESS OR CONNECTOR (CANISTER PUMP MODULE - ECM)**

NEXT

▼

8.	**CLEAR DTC**

Pre-procedure1

(a) None.

Procedure1

(b) Clear the DTCs.

Powertrain > Engine > Clear DTCs

Post-procedure1

(c) Turn the ignition switch off and wait for at least 30 seconds.

NEXT

▼

9.	**CHECK WHETHER DTC OUTPUT RECURS (AFTER REPAIR)**

Pre-procedure1

(a) Perform the Evaporative System Check using the GTS, referring to the Confirmation Driving Pattern.

Procedure1

(b) Check the DTC judgment result.

Powertrain > Engine > Utility

TESTER DISPLAY
All Readiness

(c) Input the DTC: P045011, P045015 or P04502F.

GTS 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

Post-procedure1

(d) None.

NEXT END