

DTC	P0455	Evaporative Emission Control System Leak Detected (Gross Leak)
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DTC	P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)
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DTC SUMMARY

DTC No.	Monitoring Items	Malfunction Detection Conditions	Trouble Area	Detection Timing	Detection Logic
P0455	EVAP gross leak	Leak detection pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure measured. 0.02 inch leak criterion measured at start and at end of leak check. If stabilized pressure higher than [second 0.02 inch leak criterion x 0.2], ECM determines that EVAP system has large leakage.	<ul style="list-style-type: none"> Fuel cap (loose) Leakage from EVAP line (canister - fuel tank) Leakage from EVAP line (purge VSV - canister) Canister pump module Leakage from fuel tank Leakage from canister 	While ignition switch OFF	2 trip
P0456	EVAP small leak	Leak detection pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure measured. 0.02 inch leak criterion measured at start and at end of leak check. If stabilized pressure higher than second 0.02 inch leak criterion, ECM determines that EVAP system has small leakage.	Same as above	While ignition switch OFF	2 trip

DESCRIPTION

The circuit description can be found in the Evaporative Emission (EVAP) system (see page [ES-272](#)).

Refer to the EVAP system (see page [ES-272](#)).

MONITOR DESCRIPTION

5 hours* after the ignition switch is turned OFF, the leak detection pump creates negative pressure (vacuum) in the EVAP system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.

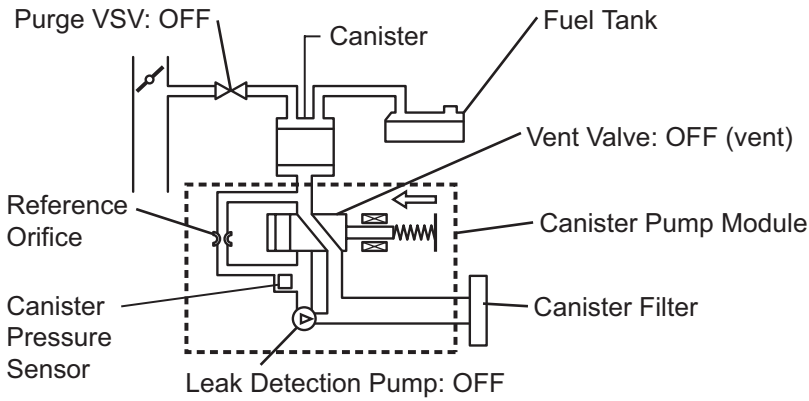
HINT:

*: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned OFF, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned OFF, the monitor check starts 2.5 hours later.

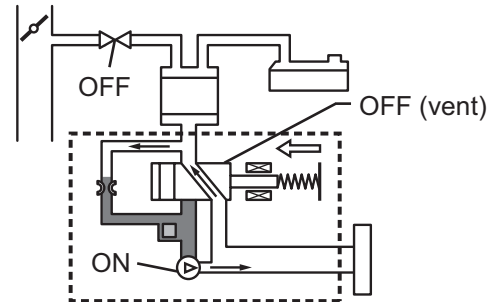
Sequence	Operations	Descriptions	Duration
-	ECM activation	Activated by soak timer 5, 7 or 9.5 hours after ignition switch OFF.	-
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If pressure in EVAP system not between 70 kPa and 110 kPa (525 mmHg and 825 mmHg), ECM cancels EVAP system monitor.	10 seconds
B	First 0.02 inch leak criterion measurement	In order to determine 0.02 inch leak criterion, leak detection pump creates negative pressure (vacuum) through reference orifice and then ECM checks if leak detection pump and vent valve operate normally.	60 seconds
C	EVAP system pressure measurement	Vent valve turned ON (closed) to shut EVAP system. Negative pressure (vacuum) created in EVAP system, and EVAP system pressure then measured. Write down measured value as it will be used in leak check. If EVAP pressure does not stabilize within 900 seconds, ECM cancels EVAP system monitor.	900 seconds*
D	Purge VSV monitor	Purge VSV opened and then EVAP system pressure measured by ECM. Large increase indicates normal.	10 seconds
E	Second 0.02 inch leak criterion measurement	After second 0.02 inch leak criterion measurement, leak check performed by comparing first and second 0.02 inch leak criterion. If stabilized system pressure higher than second 0.02 inch leak criterion, ECM determines that EVAP system leaking.	60 seconds
F	Final check	Atmospheric pressure measured and then monitoring result recorded by ECM.	-

*: If only a small amount of fuel is in the fuel tank, it takes longer for the EVAP pressure to stabilize.

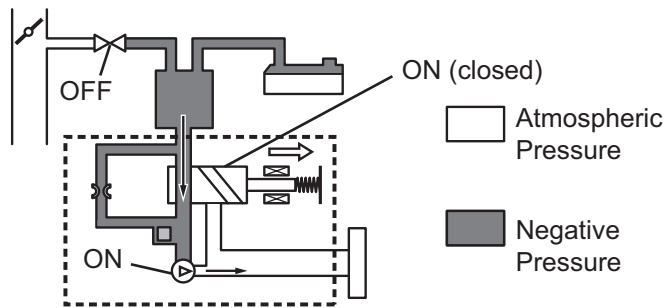
Operation A: Atmospheric Pressure Measurement



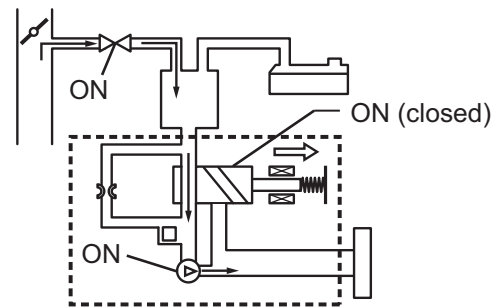
Operation B, E: 0.02 Inch Leak Criterion Measurement



Operation C: EVAP System Pressure Measurement



Operation D: Purge VSV Monitor



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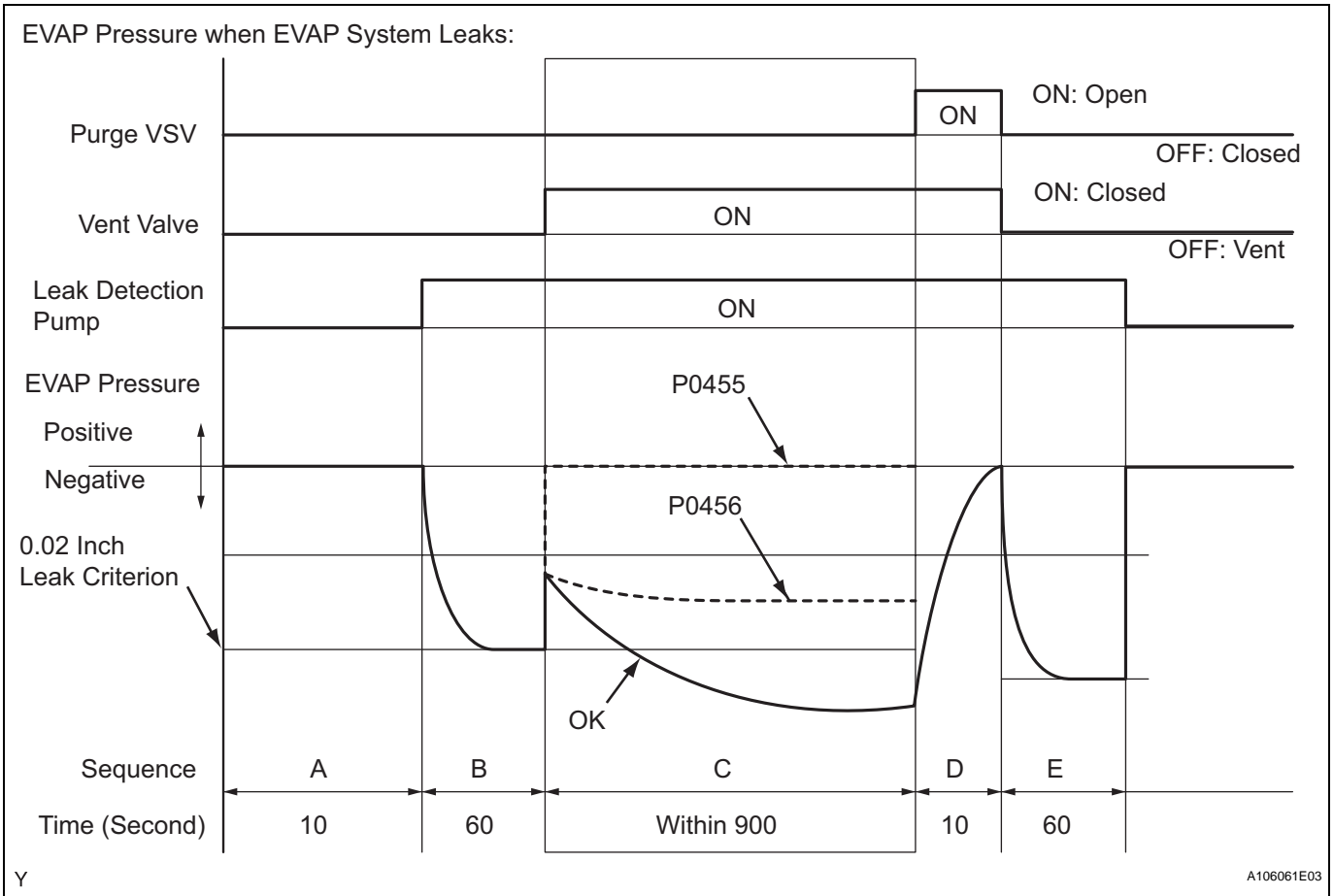
1. P0455: EVAP gross leak

In operation C, the leak detection pump creates negative pressure (vacuum) in the EVAP system and the EVAP system pressure is measured. If the stabilized system pressure is higher than [second 0.02 inch leak criterion x 0.2] (near atmospheric pressure), the ECM determines that the EVAP system has a large leakage, illuminates the MIL and sets the DTC (2 trip detection logic).

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2. P0456: EVAP very small leak

In operation C, the leak detection pump creates negative pressure (vacuum) in the EVAP system and the EVAP system pressure is measured. If the stabilized system pressure is higher than the second 0.02 inch leak criterion, the ECM determines that the EVAP system has a small leakage, illuminates the MIL and sets the DTC (2 trip detection logic).



MONITOR STRATEGY

Required Sensors/Components	Purge VSV and canister pump module
Frequency of Operation	Once per driving cycle
Duration	Within 900 seconds (varies with amount of fuel in tank)
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Enabling conditions of EVAP key-OFF monitor	
P043E (Reference orifice - low flow) P043F (Reference orifice - high flow) P0441 (Purge VSV - stuck open) P0441 (Purge VSV - stuck closed) P0451 (Canister pressure sensor - noise) P0455 (EVAP gross leak) P0456 (EVAP 0.02 inch leak) P2401 (Leak detection pump - stuck OFF) P2402 (Leak detection pump - stuck ON) P2419 (Vent valve - stuck ON) P2420 (Vent valve - stuck OFF)	
Atmospheric pressure	70 to 110 kPa (525 to 825 mmHg)

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Battery voltage	10.5 V or higher
Vehicle speed	4 km/h (2.5 mph) or less
Ignition switch	OFF
Time after key off	5 or 7 or 9.5 hours
Canister pressure sensor malfunction (P0450, P0452, P0453)	Not detected
Purge VSV	Not operated by scan tool
Vent valve	Not operated by scan tool
Leak detection pump	Not operated by scan tool
Both of the following conditions 1 and 2 are met before key off	-
1. Duration that vehicle has been driven	5 minutes or more
2. EVAP purge operation	Performed
ECT	4.4 to 35°C (40 to 95°F)
IAT	4.4 to 35°C (40 to 95°F)

1. Key-off monitor sequence 1 to 8

1. Atmospheric pressure measurement

Next sequence is run if the following condition is met	-
Atmospheric pressure change	Within 0.3 kPa (2.25 mmHg) in 1 second

2. First reference pressure measurement

Next sequence is run if the following conditions are met	-
EVAP pressure just after reference pressure measurement start	-1 kPa (-7.5 mmHg) or lower
Reference pressure	-4.85 to -1.05 kPa (726 to 754 mmHg)
Reference pressure	Saturated within 60 seconds

3. Vent valve stuck closed check

Next sequence is run if the following condition is met	-
EVAP pressure change after vent valve is ON	0.3 kPa (2.25 mmHg) or more

4. Vacuum introduction

Next sequence is run if the following condition is met	-
EVAP pressure	Saturated within 900 seconds

5. Purge VSV stuck closed check

Next sequence is run if the following condition is met	-
EVAP pressure change after purge valve is open	0.3 kPa (2.25 mmHg) or more

6. Second reference pressure measurement

Next sequence is run if the following conditions are met	-
EVAP pressure just after reference pressure measurement	-1 kPa (-7.5 mmHg) or lower
Reference pressure	-4.85 to -1.05 kPa (726 to 754 mmHg)
Reference pressure	Saturated within 60 seconds
Reference pressure difference between first and second	Less than 0.7 kPa (5.25 mmHg)

7. Leak check

Next sequence is run if the following condition is met	-
EVAP pressure when vacuum introduction is complete	Lower than second reference pressure

8. Atmospheric pressure measurement

EVAP monitor is complete if the following condition is met	-
Atmospheric pressure difference between sequence 1 and 8	Within 0.3 kPa (2.25 mmHg)

TYPICAL MALFUNCTION THRESHOLDS

"Saturated" indicates that the EVAP pressure change is less than 0.1 kPa (0.75 mmHg) in 30 seconds.

P0455: EVAP gross leak

FTP when vacuum introduction complete	Higher than reference pressure x 0.2
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P0456: EVAP small leak

FTP when vacuum introduction complete	Between "reference pressure" and "reference pressure x 0.2"
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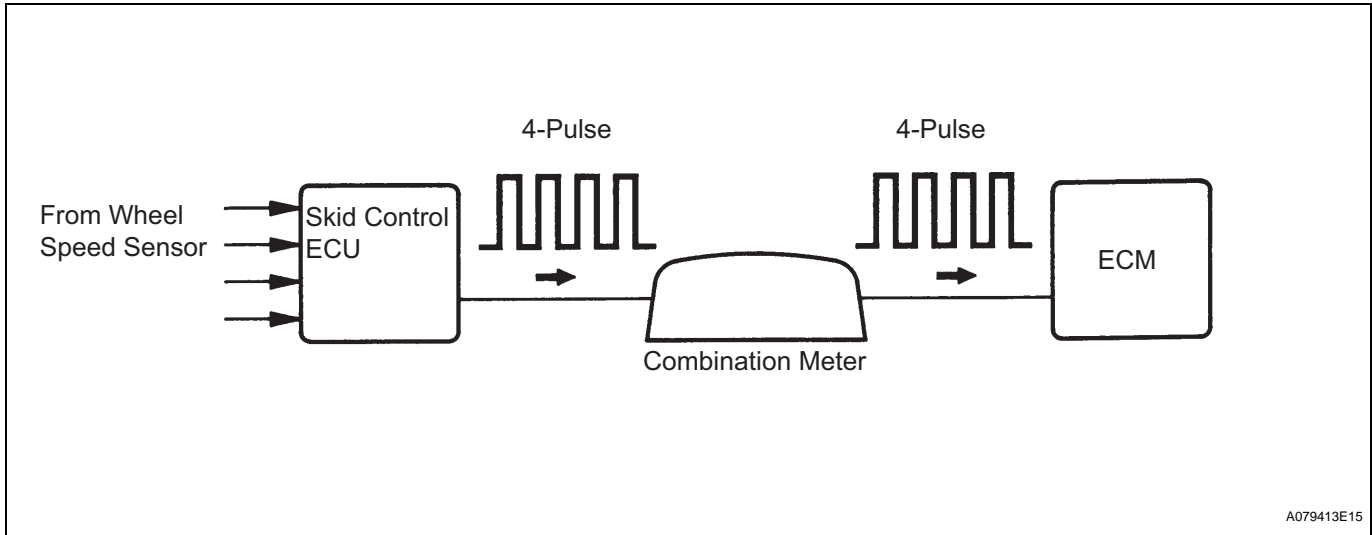
MONITOR RESULT

Refer to CHECKING MONITOR STATUS (see page [ES-19](#)).

DTC	P0500	Vehicle Speed Sensor "A"
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DESCRIPTION

Vehicles, which are equipped with ABS (Anti-lock Brake System), detect the vehicle speed using the skid control ECU and wheel speed sensor. The wheel speed sensor monitors the wheel rotation speed and sends a signal to the skid control ECU. The skid control ECU converts the wheel speed signal into a 4-pulse signal and transmits it to the ECM via the combination meter. The ECM determines the vehicle speed based on the frequency of the pulse signal.



DTC No.	DTC Detection Condition	Trouble Area
P0500	While vehicle being driven, no vehicle speed sensor signal to ECM (1 trip detection logic: Automatic transaxle) (2 trip detection logic: Manual transaxle)	<ul style="list-style-type: none"> • Open or short in vehicle speed sensor circuit • Vehicle speed sensor • Combination meter • ECM • Skid control ECU

MONITOR DESCRIPTION

Automatic Transaxle Models:

The ECM assumes that the vehicle is being driven when the indicated engine speed is more than 2,300 rpm and 30 seconds have elapsed since the Park/Neutral Position (PNP) switch was turned OFF. If there is no signal from vehicle speed sensor, despite these conditions being met, the ECM interprets this as a malfunction in the sensor. The ECM then illuminates the MIL and sets the DTC.

Manual Transaxle Models:

The ECM assumes that the vehicle is being driven while the vehicle speed sensor signal is being transmitted by the combination meter. If there is no signal from the vehicle speed sensor despite this condition being met, the ECM interprets this as a malfunction in the sensor. The ECM then illuminates the MIL and sets the DTC.

MONITOR STRATEGY

Related DTCs	P0500: Vehicle speed sensor "A" pulse input error
Required sensors / components (Main)	Vehicle Speed Sensor (VSS), Combination meter and Skid control ECU
Required sensors / components (Related)	PNP switch, Engine Coolant Temperature (ECT) sensor, Crankshaft Position (CKP) sensor and Mass Air Flow (MAF) meter
Frequency of operation	Continuous
Duration	2 seconds: Automatic transaxle, Intake air temperature -10°C (14°F) or more 8 seconds: Automatic transaxle, Intake air temperature less than -10°C (14°F) 8 seconds: Manual transaxle

MIL operation	Immediate: Automatic transaxle 2 driving cycles: Manual transaxle
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	None
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M/T:

Engine coolant temperature	70°C (158°F) or more
Engine speed	2,000 to 5,000 rpm
Fuel cut at high engine speed	Not executing

A/T:

Either of following conditions (a) or (b) met:	-
(a) Following conditions 1 and 2 met:	-
1. ECT and ECT sensor	20°C (68°F) or more, and sensor does not malfunction (P0115 or P0116)
2. Time after PNP switch turned OFF	10 seconds or more
(b) Following conditions 1 and 2 met:	-
1. ECT and ECT sensor	Less than 20°C (68°F), and sensor malfunction (P0115 or P0116)
2. Time after PNP switch turned OFF	30 seconds or more
Engine speed	2,800 rpm or more (varies with throttle valve opening angle)
Fuel cut at high engine speed	Not executing
Time after ignition switch turned ON	3 seconds or more

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TYPICAL MALFUNCTION THRESHOLDS

Vehicle speed sensor signal	No pulse input
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WIRING DIAGRAM



HINT:

Read freeze frame data using the intelligent tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, 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.

1 CHECK OPERATION OF SPEEDOMETER

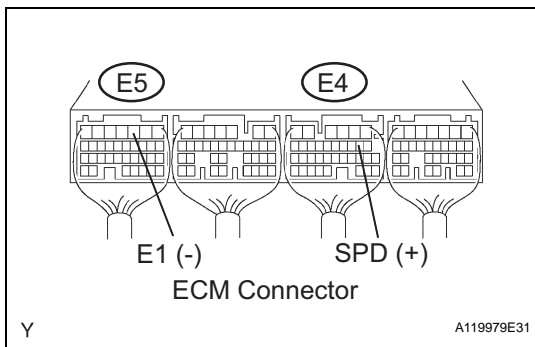
- (a) Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.
HINT:
 The vehicle speed sensor is operating normally if the speedometer reading is normal.

NG **CHECK SPEEDOMETER CIRCUIT**

OK

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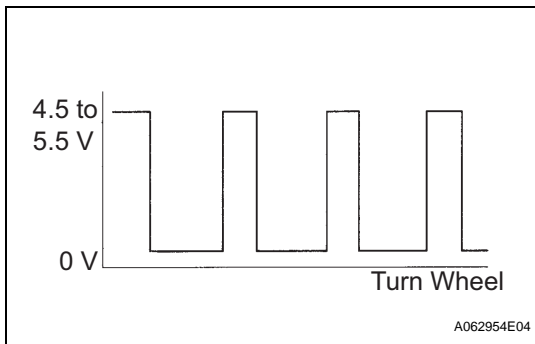
2 INSPECT ECM (SPD VOLTAGE)



- (a) Move the transmission gear selector lever to the neutral position.
- (b) Jack up the vehicle.
- (c) Turn the ignition switch ON.
- (d) Measure the voltage between the terminals of the E4 and E5 ECM connectors as the front wheel is turned slowly.

Standard voltage

Tester Connection	Specified Condition
SPD (E4-8) - E1 (E5-3)	Voltage generated intermittently



HINT:
 The output voltage should fluctuate up and down similarly to the diagram when the wheel is turned slowly.

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM