

<b>DTC</b>	<b>P0455</b>	<b>Evaporative Emission Control System Leak Detected (Gross Leak)</b>
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<b>DTC</b>	<b>P0456</b>	<b>Evaporative Emission Control System Leak Detected (Very Small Leak)</b>
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## DTC SUMMARY

DTC	Monitoring Items	Malfunction Detection Conditions	Trouble Areas	Detection Timings	Detecti on 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"> <li>Fuel cap (loose)</li> <li>Leakage from EVAP line (Canister - Fuel tank)</li> <li>Leakage from EVAP line (Purge VSV - Canister)</li> <li>Canister pump module</li> <li>Leakage from fuel tank</li> <li>Leakage from canister</li> </ul>	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 above	While ignition switch OFF	2 trip

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## DESCRIPTION

The circuit description can be found in the EVAP System (See page [ES-351](#)).

Refer to the EVAP System (See page [ES-351](#)).

## MONITOR DESCRIPTION

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

HINT:

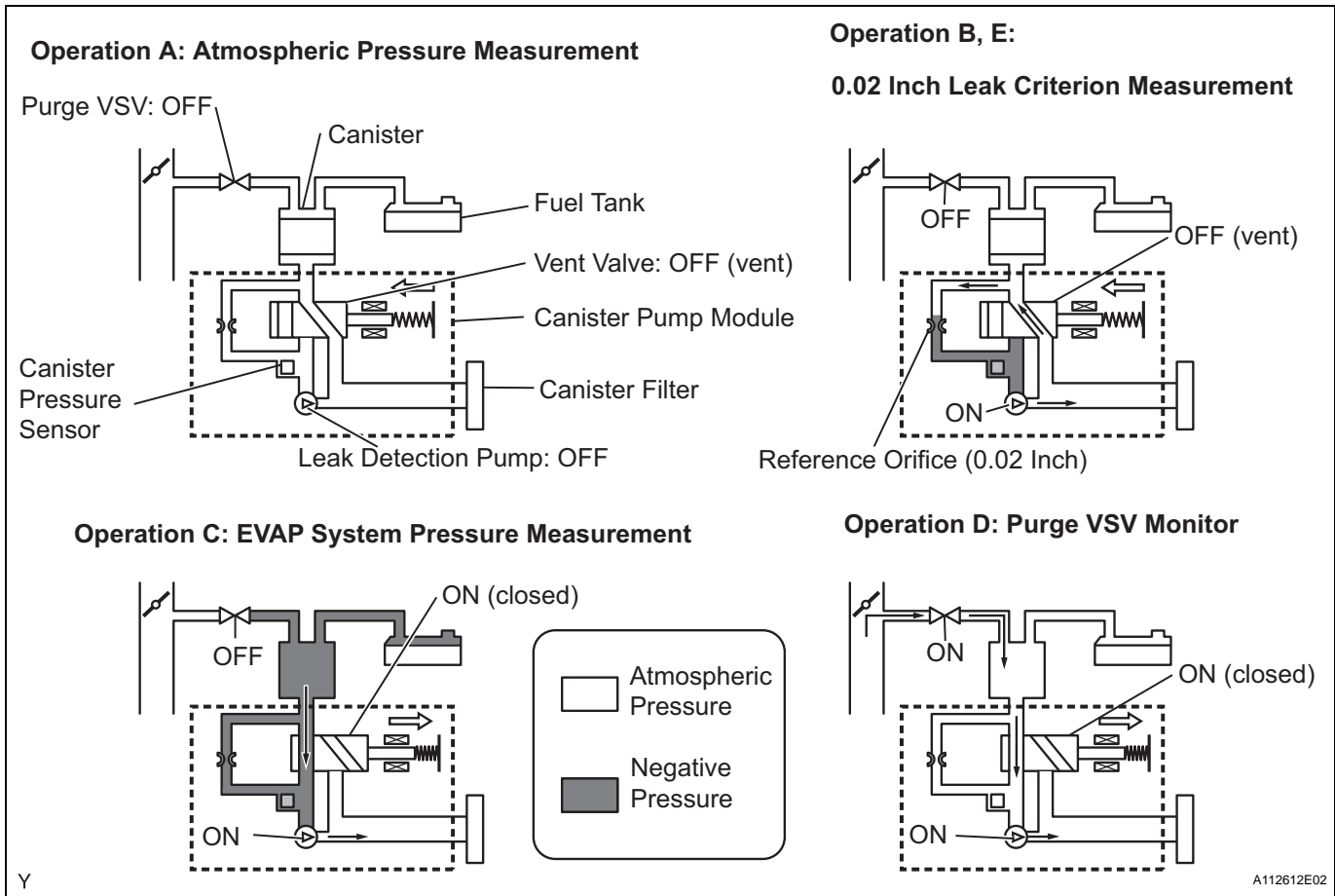
\*: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

Sequence	Operations	Descriptions	Duration
-	ECM activation	Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch turned 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 they will be used in leak check. If EVAP pressure does not stabilize within 15 minutes, ECM cancels EVAP system monitor.	15 minutes*

Sequence	Operations	Descriptions	Duration
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.

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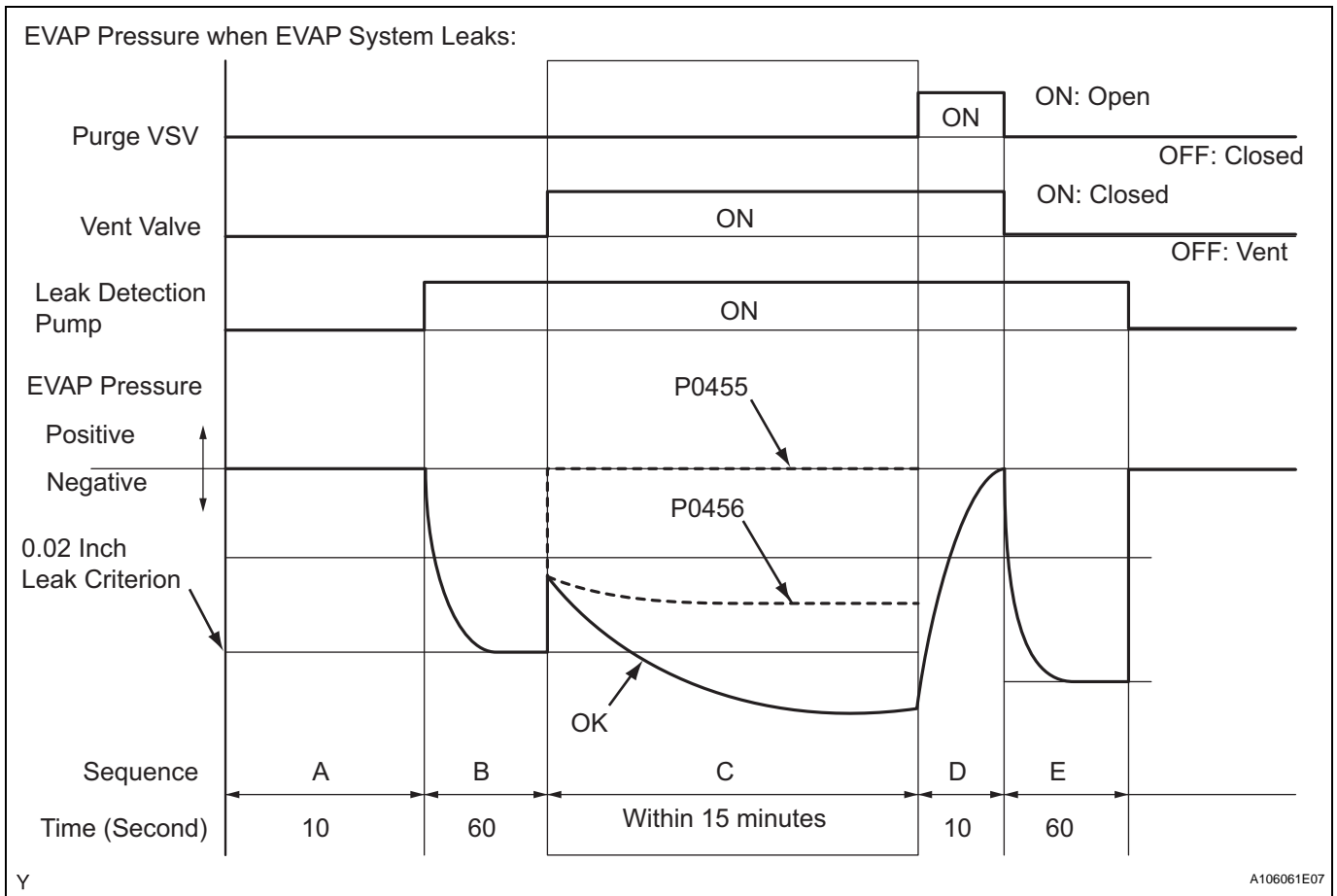


1. P0455: EVAP (Evaporative Emission) gross leak

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).

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 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).



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**MONITOR STRATEGY**

Required Sensors/Components	Purge VSV and canister pump module
Frequency of Operation	Once per driving cycle
Duration	Within 15 minutes (varies with amount of fuel in tank)
MIL Operation	2 driving cycles
Sequence of Operation	None

**TYPICAL ENABLING CONDITIONS**

Monitor runs whenever these DTCs not present	None
EVAP key-off monitor runs when all of following conditions met	-
Atmospheric pressure	525 to 825 mmHg (70 to 110 kPa)
Battery voltage	10.5 V or more
Vehicle speed	Below 2.5 mph (4 km/h)
Ignition switch	OFF
Engine condition	Not running
Fuel tank pressure sensor malfunction (P0450, P0451, P0452 and/or 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 following conditions met before IG switch OFF	Conditions 1 and 2
1. Duration that vehicle driven	5 min. or more
2. Purge flow	Executed
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

Next sequence is run if following condition set	-
Atmospheric pressure change for 10 seconds	Less than 2.25 mmHg (0.3 kPa) for 1 seconds

### 2. First 0.02 inch leak criterion

Next sequence is run if all of following conditions set	Conditions 1, 2 and 3
1. FTP when 4 seconds after 0.02 inch leak criterion measurement	-7.5 mmHg (-1 kPa) or less
2. 0.02 inch leak criterion	-36.28 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. 0.02 inch leak criterion	Saturated within 55 seconds

### 3. Vent valve stuck closed check

Next sequence is run if following condition set	-
Fuel tank pressure change for 10 seconds after vent valve ON (closed)	2.25 mmHg (0.3 kPa) or more

### 4. Vacuum introduction

Next sequence is run if both of following conditions set	-
1. Vacuum introduction time	Saturated within 12 minutes
2. Fuel tank pressure	Fuel tank pressure was standard

### 5. Purge VSV stuck closed check

Next sequence is run if following condition set	-
Fuel tank pressure change for 10 seconds after purge VSV ON (open)	2.25 mmHg (0.3 kPa) or more

### 6. Second 0.02 inch leak criterion measurement

Next sequence is run if all of following conditions set	Conditions 1, 2, 3 and 4
1. Fuel tank pressure when 4 sec. after 0.02 inch leak criterion measurement	-7.5 mmHg (-1 kPa) or less
2. 0.02 inch leak criterion	-36.4 to -7.92 mmHg (-4.85 to -1.057 kPa)
3. 0.02 inch leak criterion	Saturated within 55 seconds
4. 0.02 inch leak criterion difference between first and second	5.25 mmHg (0.7 kPa) or less

### 7. Leak check

Next sequence is run if following condition set	-
Fuel tank pressure when vacuum introduction was complete	Second 0.02 inch leak criterion or less

### 8. Atmospheric pressure

Monitor is complete if following conditions set	-
Atmospheric pressure difference between sequences 1 and 8	2.25 mmHg (0.3 kPa) or less

## TYPICAL MALFUNCTION THRESHOLDS

### P0455: EVAP gross leak

Fuel tank pressure when vacuum introduction complete	Higher than 0.02 inch leak criterion x 0.2
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### P0456: EVAP small leak

Fuel tank pressure when vacuum introduction complete	Between 1 and 2
Condition 1	Higher than second 0.02 inch leak criterion

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Condition 2	Lower than 0.02 inch leak criterion x 0.2
Atmospheric pressure (absolute pressure)	70 kPa (525 mmHg) or more, and less than 110 kPa (825 mmHg)

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

## MONITOR RESULT

Detailed information on Checking Monitor Status (See page [ES-19](#)).

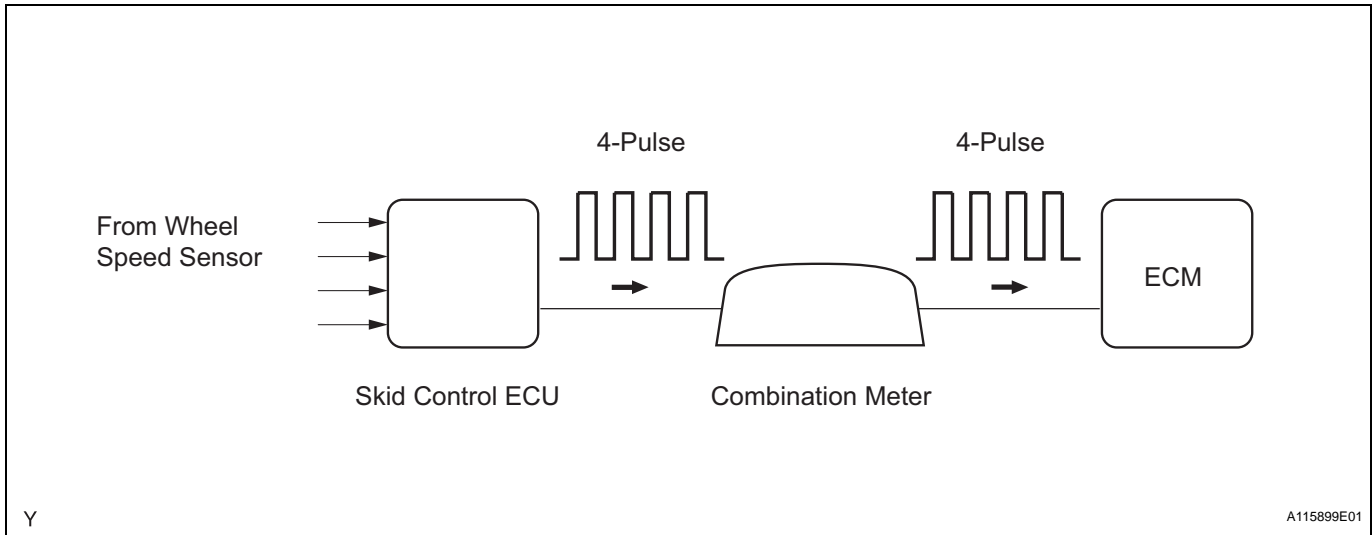
<b>DTC</b>	<b>P0500</b>	<b>Vehicle Speed Sensor "A"</b>
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**DESCRIPTION**

Automatic Transaxle Models:

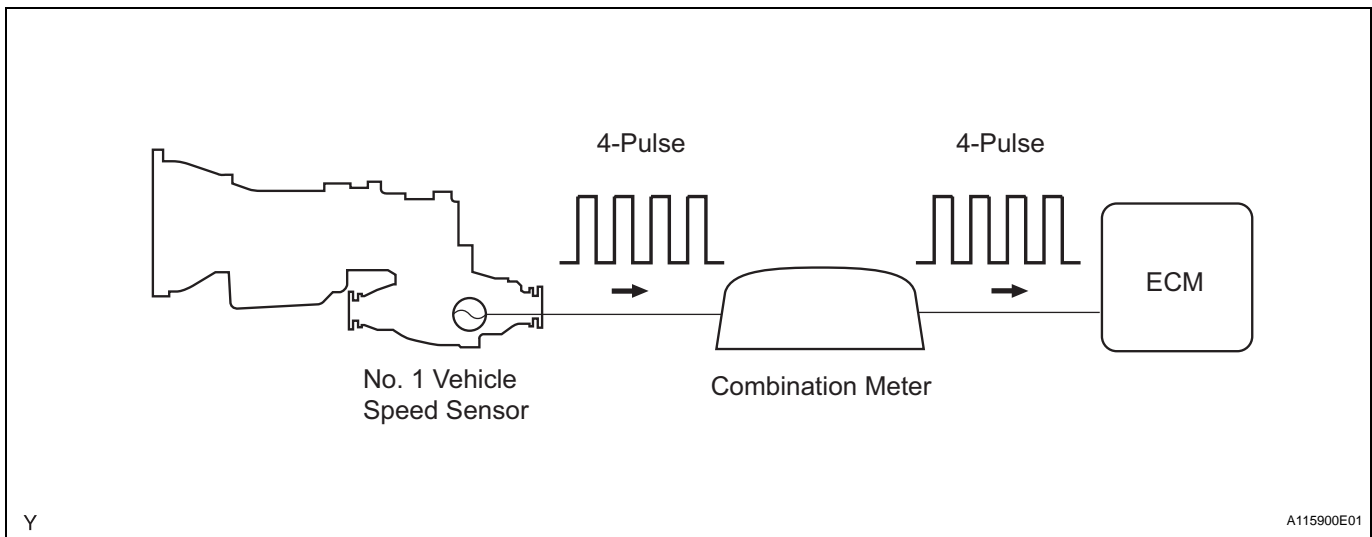
Vehicles, which are equipped with ABS (Anti-lock Brake System), detect the vehicle speed using the skid control ECU and wheel speed sensor. The wheel speed sensor monitors the wheel rotation speed and sends a signal to the skid control ECU. The skid control ECU converts the wheel speed signal into a 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.

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Manual Transaxle Models:

Vehicles, which are equipped with manual transaxle, detect the vehicle speed using the No. 1 vehicle speed sensor. The No. 1 vehicle speed sensor transmits a 4-pulse signal for every revolution of the rotor shaft, which is rotated by the transaxle or transfer output shaft via the driven gear. The 4-pulse signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter. The signal is then transmitted to the ECM. The ECM determines the vehicle speed based on the frequency of the pulse signal.



DTC No.	DTC Detection Conditions	Trouble Areas
P0500	ECM detects following conditions simultaneously 500 times (1 trip detection logic) <ul style="list-style-type: none"> <li>No SP1 (speed sensor) signal while ECM detects SP2 (No. 2 speed sensor) signal</li> <li>Vehicle speed 6 mph (9 km/h) or more for 4 seconds</li> <li>Park/Neutral position switch OFF (shift lever other than P and N positions)</li> <li>Transfer lever in other than N position (4WD)</li> </ul>	<ul style="list-style-type: none"> <li>Open or short in speed signal circuit</li> <li>Combination meter</li> <li>ECM</li> <li>Skid control ECU</li> </ul>

## MONITOR DESCRIPTION

### Automatic 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 combination meter, despite the ECM detecting the speed signal from the speed sensor No. 2, the ECM interprets this as a malfunction in the speed signal circuit. The ECM then illuminates the MIL and sets a DTC.

### Manual Transaxle Models:

The ECM assumes that the vehicle is being driven, when the indicated engine speed is more than 2,000 rpm and the engine load calculated by the ECM is more than certain level. If there is no signal from the vehicle speed sensor, despite these conditions being met, the ECM interprets this as a malfunction in the speed signal circuit. The ECM then illuminates the MIL and sets a 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)	Park/neutral Position (PNP) switch, Engine Coolant Temperature (ECT) sensor, Crankshaft Position (CKP) sensor and Mass Air Flow (MAF) meter
Frequency of Operation	Continuous
Duration	8 seconds: Manual transmission Conditions met 500 times: Automatic transmission
MIL Operation	Immediate: Manual transmission 2 driving cycles: Automatic transmission
Sequence of Operation	None

## TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	None
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### Manual Transmission:

Engine coolant temperature	70°C (158°F) or more
Engine speed	2,000 to 6,800 rpm
Fuel cut at high engine speed	Not executing
Engine load	38.5 % at 2,000 rpm 40 % at 3,600 rpm 43.5 % at 5,200 rpm 50 % at 6,800 rpm

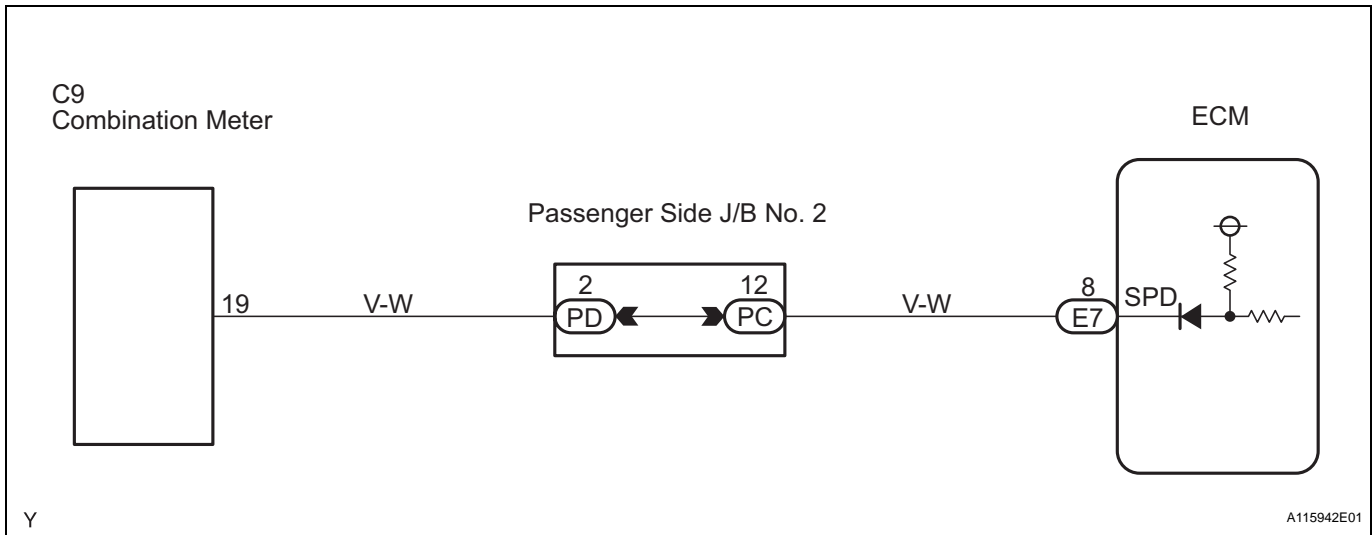
### Automatic Transmission:

Time after following conditions met:	4 seconds or more
Ignition switch	ON
Park/neutral position switch	OFF
Vehicle speed	5.59 mph (9 km/h) or more
Time after ignition switch OFF to ON	More than 0.5 seconds

**TYPICAL MALFUNCTION THRESHOLDS**

Vehicle speed sensor signal	No pulse input
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**WIRING DIAGRAM**



**HINT:**

Read freeze frame data using an intelligent tester. Freeze frame data record the engine condition when malfunctions are detected. 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.

**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.

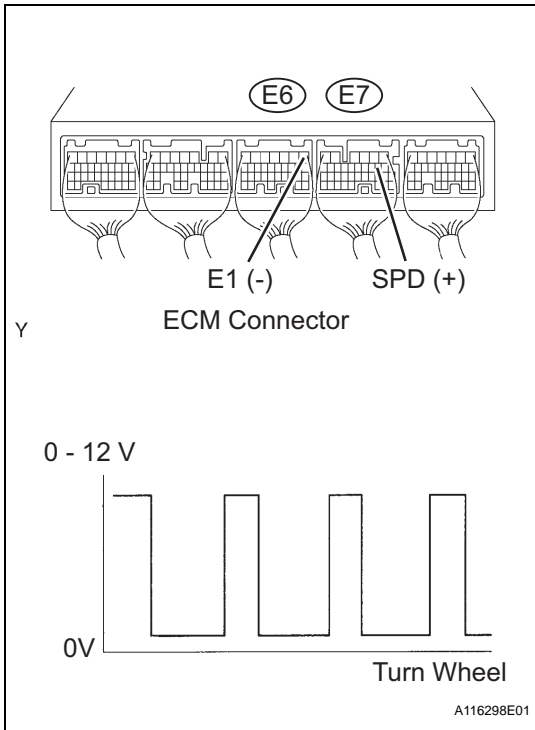
**NG CHECK SPEEDOMETER CIRCUIT**

**OK**

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**2 INSPECT ECM (SPD VOLTAGE)**



- (a) Shift the transmission gear selector lever to the neutral position.
- (b) Jack up the vehicle.
- (c) Turn the ignition switch ON.
- (d) Check the voltage between the terminals of the E6 and E7 ECM connectors as the wheel is turned slowly.

**Standard**

Tester Connections	Specified Conditions
SPD (E7-8) - E1 (E6-1)	Voltage generated intermittently

**HINT:**

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

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

**OK**

**REPLACE ECM**

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