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| DTC | P2419 | Evaporate Emission System Switching Valve Control Circuit Low |
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| DTC | P2420 | Evaporate Emission System Switching Valve Control Circuit High |
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CIRCUIT DESCRIPTION

Refer to the EVAP Inspection Procedure (see page [DI-368](#)).

| DTCs | Monitoring Item | DTC Detection Conditions | Trouble Areas | Detection Timing | Detection Logic |
|-------|------------------------------|---|--|---------------------------|-----------------|
| P2419 | Vent valve stuck ON (Closed) | One of following conditions are met: <ul style="list-style-type: none"> • 0.02 inch orifice low-flow • 0.02 inch orifice high-flow • Vacuum pump ON stuck • Vacuum pump OFF stuck • Vent valve ON (Closed) stuck NOTE: P043E, P043F, P2401, P2402 and P2419 have same DTC detection conditions. | <ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module – ECM) • ECM | While Ignition switch OFF | 2 trips |
| P2420 | Vent valve stuck OFF (Vent) | Vent valve OFF (Vent) stuck | | | |

WIRING DIAGRAM

Refer to the EVAP Inspection Procedure (see page [DI-368](#)).

MONITOR DESCRIPTION

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

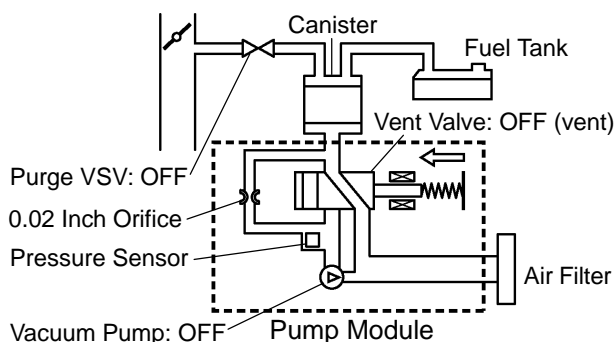
HINT:

*: 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.

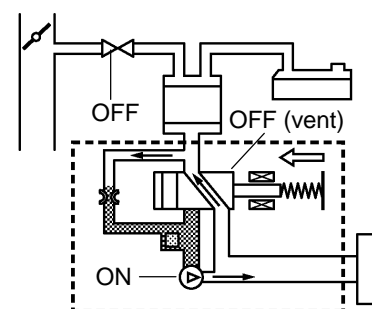
| Sequence | Operations | Descriptions | Duration |
|----------|--|--|-------------|
| – | ECM activation | Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch turned to OFF. | – |
| A | Atmospheric pressure measurement | Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If EVAP pressure is 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 pressure measurement | In order to determine 0.02 inch leak pressure standard, vacuum pump creates negative pressure (vacuum) through 0.02 inch orifice and then ECM checks if vacuum 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 the measured value as it will be used in the leak check. If EVAP pressure does not stabilize within 15 minutes, ECM cancels EVAP system monitor. | 15 minutes* |
| 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 pressure measurement | Leak check is performed after second 0.02 inch leak pressure standard is measured. If stabilized system pressure higher than second 0.02 inch leak pressure standard, 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.

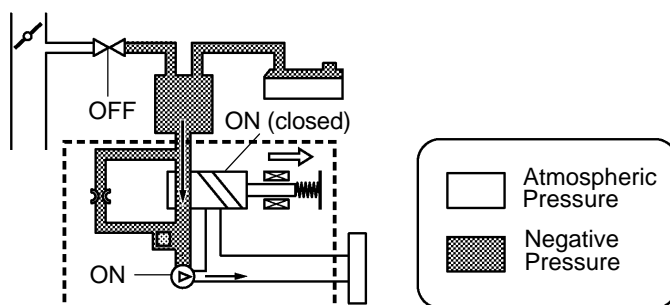
Operation A: Atmospheric Pressure Measurement



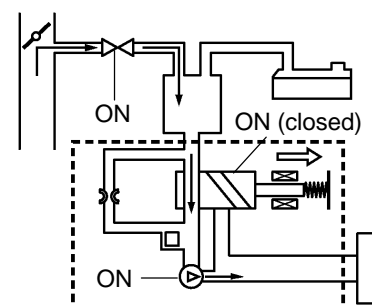
Operation B: 0.02 Inch Leak Pressure Measurement



Operation C: EVAP Leak Check

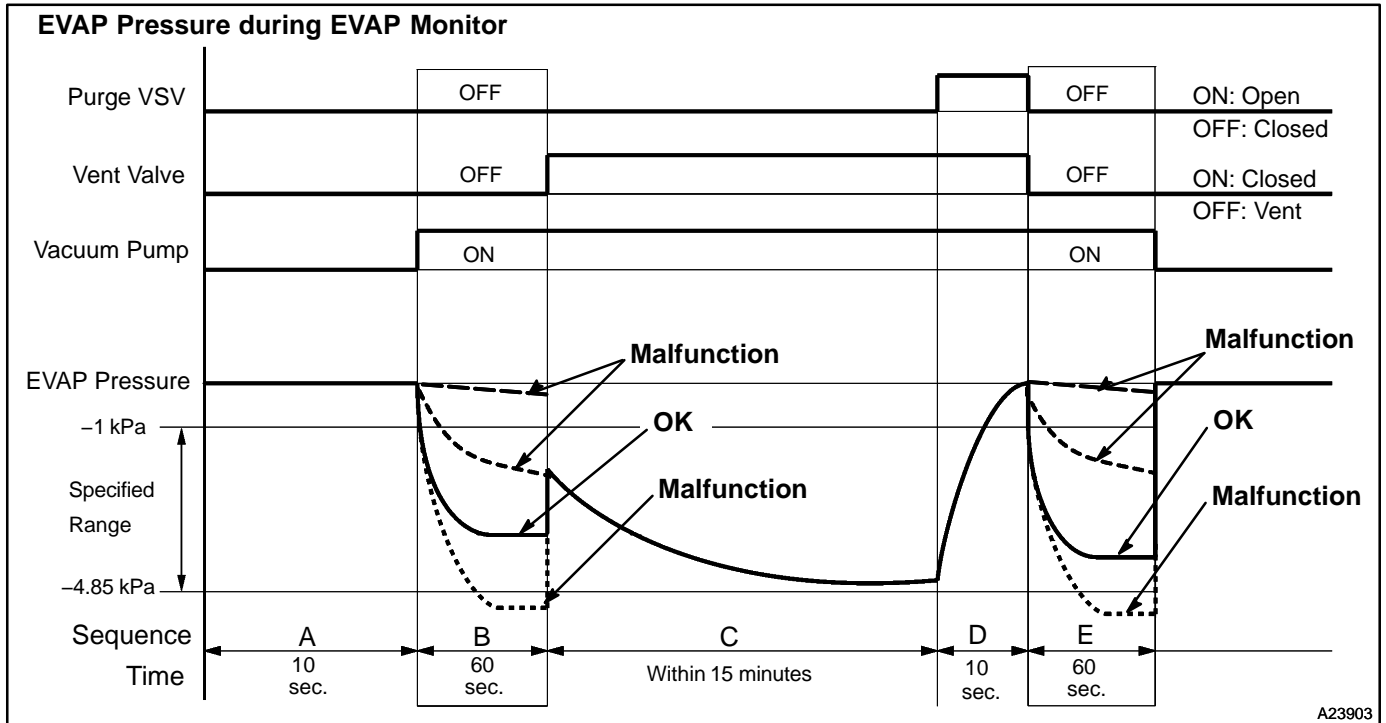


Operation D: Purge VSV monitor



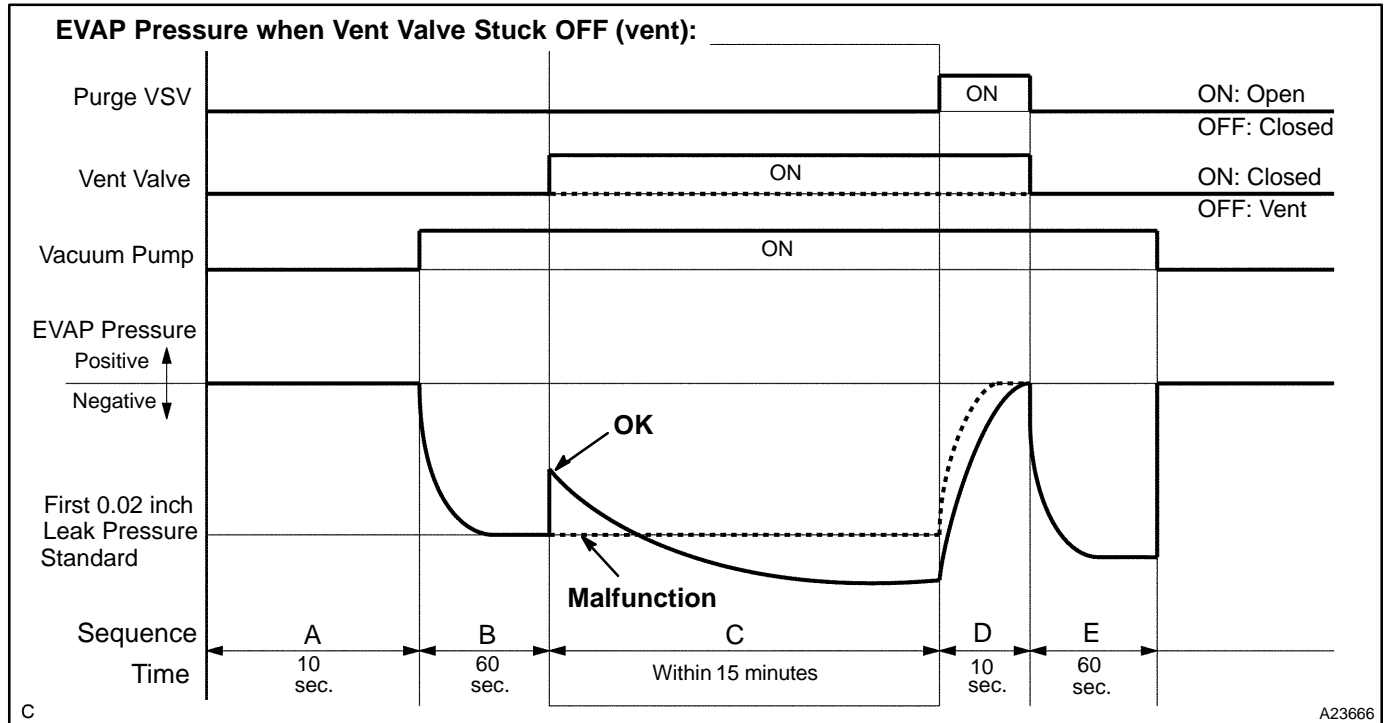
(a) P2419: Vent valve stuck ON (Closed)

In sequence B and E, to determine the leak criterion, the vacuum pump creates negative pressure in the canister pump module through the 0.02 inch orifice. If the pressure is out of specified range or is not saturated, the ECM illuminates the MIL and sets DTCs P043E, P043F, P2401, P2402 and P2419 (2-trip detection logic).



(b) P2420: Vent valve stuck OFF (vent)

In sequence C, the vent valve turns ON (closes) and the EVAP (Evaporative Emission) system pressure is then measured by the ECM, using the pressure sensor, to conduct an EVAP leak check. If the pressure does not increase when the vent valve turned ON (closed), the ECM interprets this as the vent valve being stuck OFF (vent). The ECM illuminates the MIL and sets the DTC.



MONITOR STRATEGY

| | | |
|-----------------------------|------------------------|-------------------------|
| Related DTCs | P2419 | Vent valve stuck open |
| | P2420 | Vent valve stuck closed |
| Required sensors/components | Vent valve | |
| Frequency of operation | Once per driving cycle | |
| Duration | Within 2 minutes | |
| MIL operation | 2 driving cycles | |
| Sequence of operation | None | |

TYPICAL ENABLING CONDITIONS

| Item | Specification | |
|--|---------------------------------|------------------|
| | Minimum | Maximum |
| The monitor will run whenever these DTCs are not present | See page DI-18 | |
| Atmospheric pressure | 70 to 110 kPa (525 to 825 mmHg) | |
| Battery voltage | 10.5 V | – |
| Vehicle speed | – | 2.5 mph (4 km/h) |
| Ignition switch | OFF | |
| EVAP pressure sensor malfunction (P450, P0452, P0453) | Not detected | |
| EVAP canister purge valve | Not operated by scan tool | |
| EVAP canister vent valve | Not operated by scan tool | |
| EVAP leak detection pump | Not operated by scan tool | |

DIAGNOSTICS – ENGINE (1GR-FE)

| | | |
|--|--|--------------------------------|
| Both of the following conditions are met before IG switch OFF | Condition 1 and 2 | |
| 1. Duration that vehicle is driven | 5 min. | – |
| 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) | |
| Time after key off | 5 or 7 or 9.5 hours | |
| EVAP key-off monitor sequence | 1 to 8 | |
| 1. Atmospheric pressure | – | |
| Next sequence is run if the following condition is set | – | |
| Atmospheric pressure change | – | 0.3 kPa (2.25 mmHg) for 1 sec. |
| 2. First reference pressure measurement | – | |
| Next sequence is run if all of the following conditions are set | Condition 1, 2 and 3 | |
| 1. EVAP pressure just after reference pressure measurement start | – | –1 kPa (–7.5 mmHg) |
| 2. Reference pressure | –4.85 to –1.057 kPa (–36.38 to –7.93 mmHg) | |
| 3. Reference pressure | Saturated | |
| 3. EVAP canister vent valve close stuck check | – | |
| Next sequence is run if the following condition is set | – | |
| EVAP pressure change after vent valve is ON | 0.3 kPa (2.25 mmHg) | – |
| 4. Vacuum introduction | – | |
| Next sequence is run if the following condition is set | Condition 1 and 2 | |
| EVAP pressure | Saturated within 12 minutes | |
| 5. EVAP canister purge valve close stuck check | – | |
| Next sequence is run if the following condition is set | – | |
| EVAP pressure change after purge valve is open | 0.3 kPa (2.25 mmHg) | – |
| 6. Second reference pressure measurement | – | |
| Next sequence is run if all of the following conditions are set | Condition 1, 2, 3 and 4 | |
| 1. EVAP pressure just after reference pressure measurement | – | –1 kPa (–7.5 mmHg) |
| 2. Reference pressure | –4.85 to –1.057 kPa (–36.4 to –7.92 mmHg) | |
| 3. Reference pressure | Saturated | |
| 4. Difference between first reference pressure and second reference pressure | – | 0.7 kPa (5.25 mmHg) |

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| 7. Leak check | – | |
| Next sequence is run if the following condition is set | – | |
| EVAP pressure when vacuum introduction is complete | – | Second reference pressure |
| 8. Atmospheric pressure | – | |
| EVAP monitor is complete is the following condition is set | – | |
| Atmospheric pressure difference between sequence 1 and 8 | – | 0.3 kPa (2.25 mmHg) |

TYPICAL MALFUNCTION THRESHOLDS

| Detection Criteria | Threshold |
|--|---------------------------------|
| Vent valve stuck open: | |
| One of the following conditions is set | Condition 1, 2, 3, 4 or 5 |
| 1. EVAP pressure just after reference pressure measurement start | –1 kPa (–7.5 mmHg) or more |
| 2. Reference pressure | –4.85 kPa (–36.38 mmHg) or less |
| 3. Reference pressure | –1.057 kPa (–7.93 mmHg) or more |
| 4. Reference pressure | Not saturated |
| 5. Difference between first reference pressure and second reference pressure | More than 0.7 kPa (5.25 mmHg) |
| Vent valve stuck closed: | |
| EVAP pressure change after EVAP canister vent valve is ON | Less than 0.3 kPa (2.25 mmHg) |

MONITOR RESULT (MODE 06 DATA)

Refer to page [DI-26](#) for detailed information.

INSPECTION PROCEDURE

Refer to the EVAP Inspection Procedure (see page [DI-368](#)).