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|------------|--------------|---|
| DTC | P0751 | SHIFT SOLENOID "A" PERFORMANCE (SHIFT SOLENOID VALVE S1) |
|------------|--------------|---|

SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor and crankshaft position sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear).

Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect the mechanical trouble of the shift solenoid valves, the valve body or automatic transaxle (clutch, brake or gear etc.).

| DTC No. | DTC Detecting Condition | Trouble Area |
|---------|---|---|
| P0751 | During normal driving, the gear required by the ECM does not match the actual gear (2-trip detection logic) | <ul style="list-style-type: none"> • Shift solenoid valve S1 remains open or closed • Valve body is blocked • Shift solenoid valve S1 • Automatic transaxle (clutch, brake or gear etc.) • ECM |

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". According to the input shaft revolution, intermediate (counter) shaft revolution and output shaft revolution, the ECM detects the actual gear position (1st, 2nd, 3rd or O/D gear position). When the gear position commanded by the ECM and the actual gear position are not same, the ECM illuminates the MIL.

MONITOR STRATEGY

| | | |
|-----------------------------|-------------------------|---|
| Related DTCs | P0751 | Shift solenoid "A" (S1)/Rationality check |
| | | Shift solenoid "A" (S1)/OFF malfunction |
| | | Shift solenoid "A" (S1)/ON malfunction |
| Required sensors/Components | Shift solenoid valve S1 | |
| Frequency of operation | Continuous | |
| Duration | Less than 10 sec. | |
| MIL operation | 2 driving cycles | |
| Sequence of operation | None | |

TYPICAL ENABLING CONDITIONS

| Item | Specification | |
|---|---------------------------------|---------------------------|
| | Minimum | Maximum |
| The monitor will run whenever the following DTCs are not present. | See page 05-369 | |
| OFF malfunction (A) | | |
| IAT (only for malfunction) | -10 °C (14 °F) or more | Less than 70 °C (158 °F) |
| ECT | 55 °C (131 °F) or more | Less than 105 °C (221 °F) |
| Transmission shift position | "D" | |
| Shift solenoid "A" (S1) circuit | Not circuit malfunction | |
| Shift solenoid "B" (S2) circuit | Not circuit malfunction | |
| Torque converter clutch solenoid (SL) circuit | Not circuit malfunction | |
| Battery voltage | 10 V or more | - |
| Spark retard by KCS control | 0° CA or more | - |
| ECM selected gear | 1st | |
| Throttle valve opening angle | 30 % or more | - |
| OFF malfunction (B) | | |
| IAT (only for malfunction) | -10 °C (14 °F) or more | Less than 70 °C (158 °F) |
| ECT | 55 °C (131 °F) or more | Less than 105 °C (221 °F) |

| | | |
|---|-------------------------|---------------------------|
| Transmission shift position | "D" | |
| Shift solenoid "A" (S1) circuit | Not circuit malfunction | |
| Shift solenoid "B" (S2) circuit | Not circuit malfunction | |
| Torque converter clutch solenoid (SL) circuit | Not circuit malfunction | |
| Battery voltage | 10 V or more | – |
| Spark retard by KCS control | 0° CA or more | – |
| Current ECM selected gear | 2nd | |
| Last ECM selected gear | 1st | |
| Throttle valve opening angle | 7 % or more | – |
| Closing change of throttle valve opening angle | –5 % or more | Less than 5 % |
| THlast – TH current THlast: Throttle valve opening angle at last ECM selected gear THcurrent: Throttle valve opening angle at current ECM selected gear | –5 % or more | Less than 5 % |
| OFF malfunction (C), (D) and (E) | | |
| IAT (only for malfunction) | –10 °C (14 °F) or more | Less than 70 °C (158 °F) |
| ECT | 55 °C (131 °F) or more | Less than 105 °C (221 °F) |
| Transmission shift position | "D" | |
| Shift solenoid "A" (S1) circuit | Not circuit malfunction | |
| Shift solenoid "B" (S2) circuit | Not circuit malfunction | |
| Torque converter clutch solenoid (SL) circuit | Not circuit malfunction | |
| Battery voltage | 10 V or more | – |
| Spark retard by KCS control | 0° CA or more | – |
| Engine idling | OFF | |
| Braking | OFF | |
| ECM selected gear | 2nd | |
| Throttle valve opening angle | 7 % or more | Less than 60 % |
| OFF malfunction (F) and (G) | | |
| IAT (only for malfunction) | –10 °C (14 °F) or more | Less than 70 °C (158 °F) |
| ECT | 55 °C (131 °F) or more | Less than 105 °C (221 °F) |
| Transmission shift position | "D" | |
| Shift solenoid "A" (S1) circuit | Not circuit malfunction | |
| Shift solenoid "B" (S2) circuit | Not circuit malfunction | |
| Torque converter clutch solenoid (SL) circuit | Not circuit malfunction | |
| Battery voltage | 10 V or more | – |
| Spark retard by KCS control | 0° CA or more | – |
| Engine idling | OFF | |
| Braking | OFF | |
| ECM selected gear | 3rd | |
| Throttle valve opening angle | 5 % or more | Less than 60 % |
| OFF malfunction (H) and (I) | | |
| IAT (only for malfunction) | –10 °C (14 °F) or more | Less than 70 °C (158 °F) |
| ECT | 55 °C (131 °F) or more | Less than 105 °C (221 °F) |
| Transmission shift position | "D" | |
| Shift solenoid "A" (S1) circuit | Not circuit malfunction | |
| Shift solenoid "B" (S2) circuit | Not circuit malfunction | |
| Torque converter clutch solenoid (SL) circuit | Not circuit malfunction | |
| Battery voltage | 10 V or more | – |

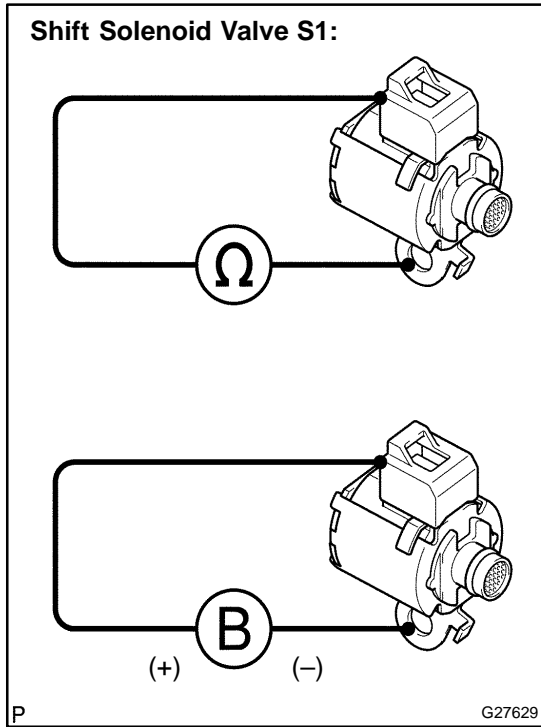
| | | |
|---|---|--|
| Spark retard by KCS control | 0° CA or more | – |
| Engine idling | OFF | |
| Braking | OFF | |
| ECM selected gear | 4th | |
| Throttle valve opening angle | 5 % or more | Less than 60 % |
| OFF malfunction (J) | | |
| IAT (only for malfunction) | –10 °C (14 °F) or more | Less than 70 °C (158 °F) |
| ECT | 55 °C (131 °F) or more | Less than 105 °C (221 °F) |
| Transmission shift position | "D" | |
| Shift solenoid "A" (S1) circuit | Not circuit malfunction | |
| Shift solenoid "B" (S2) circuit | Not circuit malfunction | |
| Torque converter clutch solenoid (SL) circuit | Not circuit malfunction | |
| Battery voltage | 10 V or more | – |
| Spark retard by KCS control | 0° CA or more | – |
| Engine idling | ON | |
| Braking | ON | |
| Throttle valve opening angle | 65 % or more (ECM selected gear 2nd) | Less than 5 % (ECM selected gear 2nd) |
| | 65 % or more (ECM selected gear 3rd) | Less than 3 % (ECM selected gear 3rd) |
| | 65 % or more (ECM selected gear 4th) | Less than 3 % (ECM selected gear 4th) |
| THcurrent – TH2ndstep THcurrent: Throttle valve opening angle at current ECM selected gear TH2ndstep: Throttle valve opening angle at 2nd judgment step | Less than –10 % or 10 % or more | |
| Closing change of throttle valve opening angle | Less than –10 % or 10 % or more | |
| ON malfunction | | |
| IAT (only for malfunction) | –10 °C (14 °F) or more | Less than 70 °C (158 °F) |
| ECT | 55 °C (131 °F) or more | Less than 105 °C (221 °F) |
| Transmission shift position | "D" | |
| Shift solenoid "A" (S1) circuit | Not circuit malfunction | |
| Shift solenoid "B" (S2) circuit | Not circuit malfunction | |
| Torque converter clutch solenoid (SL) circuit | Not circuit malfunction | |
| Battery voltage | 10 V or more | – |
| Spark retard by KCS control | 0° CA or more | – |
| ECM selected gear | 4th | |
| Throttle valve opening angle | 12 % or more | Less than 35 % |

TYPICAL MALFUNCTION THRESHOLDS

| Detection criteria | Threshold |
|---|---|
| OFF malfunction: | |
| There are 2 judgment steps/driving cycle 1st judgment step: when following conditions met, temporary flag becomes ON. OFF malfunction (A) or (B) It is necessary 2 judgments/driving cycle 2nd judgment step: when following conditions met, pending fault code becomes ON. (OFF malfunction (E) and (G) and (H)) or (OFF malfunction (C) and (D) and (F) and (I)) | |
| OFF malfunction (A) | |
| Engine speed (NE) | $< 2 \times \text{NO} + 1,100 \text{ rpm}$ NO: Transmission output speed |
| OFF malfunction (B) | |
| NElast – NEcurrent NElast: Engine speed at last ECM selected gear NEcurrent: Engine speed at current ECM selected gear | $< 512.5 \text{ rpm}$ at throttle valve opening angle 40 % (condition vary with throttle valve opening angle) |
| OFF malfunction (C) | |
| Engine speed (NE) | $< 1\text{st gear ratio} \times \text{NO} + 50 \text{ rpm}$ NO: Transmission output speed |
| OFF malfunction (D) | |
| Engine speed (NE) | $\geq 2\text{nd gear ratio} \times \text{NO} + 50 \text{ rpm}$ or $< 2\text{nd gear ratio} \times \text{NO} - 50 \text{ rpm}$ NO: Transmission output speed |
| OFF malfunction (E) and (F) | |
| Engine speed (NE) | $< 3\text{rd gear ratio} \times \text{NO} + 50 \text{ rpm}$ and $\geq 3\text{rd gear ratio} \times \text{NO} - 50 \text{ rpm}$ NO: Transmission output speed |
| OFF malfunction (G) | |
| Engine speed (NE) | $\geq 4\text{th gear ratio} \times \text{NO} + 50 \text{ rpm}$ or $< 4\text{th gear ratio} \times \text{NO} - 50 \text{ rpm}$ NO: Transmission output speed |
| OFF malfunction (H) | |
| Engine speed (NE) | $\geq 3\text{rd gear ratio} \times \text{NO} + 50 \text{ rpm}$ or $< 3\text{rd gear ratio} \times \text{NO} - 50 \text{ rpm}$ NO: Transmission output speed |
| OFF malfunction (I) | |
| Engine speed (NE) | $< 4\text{th gear ratio} \times \text{NO} + 50 \text{ rpm}$ and $\geq 4\text{th gear ratio} \times \text{NO} - 50 \text{ rpm}$ NO: Transmission output speed |
| OFF malfunction (J) | |
| When one of following secondary parameter conditions met, 2nd judgment is stopped. | (See secondary parameters and condition) |
| ON malfunction: | |
| Engine speed (NE) | $\geq 2 \times \text{NO} + 1,100 \text{ rpm}$ NO: Transmission output speed |

INSPECTION PROCEDURE

1 INSPECT SHIFT SOLENOID VALVE(S1)



- (a) Remove the shift solenoid valve S1.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

| Tester Connection | Specified Condition 20 °C (68 °F) |
|--|--------------------------------------|
| Solenoid Connector (S1) – Solenoid Body (S1) | 11 to 15 Ω |

- (c) Connect the positive (+) battery lead to the solenoid connector terminal, and the negative (-) battery lead to the solenoid body for checking the solenoid valve operation.

Standard:

The solenoid makes an operating noise.

NG → REPLACE SHIFT SOLENOID VALVE(S1)

OK

2 INSPECT TRANSMISSION VALVE BODY ASSY(See chapter 2 in the problem symptoms table) (See page 05-374)

NG → REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSY (See page 40-23)

OK

REPAIR OR REPLACE AUTOMATIC TRANSAXLE ASSY (See page 40-7)