DTC P0756 SHIFT SOLENOID ”B” PERFORMANCE (SHIFT SOLENOID VALVE S2)

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
P0756	During normal driving, the gear required by the ECM does not match the actual gear (2–trip detection logic)	• Shift solenoid valve S2 remains open or closed • Valve body is blocked • Shift solenoid valve S2 • 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	P0756	Shift solenoid ”B” (S2)/Rationality check
		Shift solenoid ”B” (S2)/OFF malfunction
		Shift solenoid ”B” (S2)/ON malfunction
Required sensors/Components	Shift solenoid valve S2	
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	2nd	
Throttle valve opening angle	10 % or more	Less than 35 %
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	–
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)		
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 (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	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 (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	4th with lock up	
ON 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 %
ON 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 %
ON malfunction (F)		
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 %
ON malfunction (G) and (H)		
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 %
ON malfunction (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	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	

TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
OFF malfunction:	
Following conditins met (1) or (2) (1): OFF malfunction (A) (2): OFF malfunction (B), (C), (D), (E), (F), (G), (H)	
(1)	
It is necessary 2 judgment/driving cycle 1st judgment: temporary flag ON 2nd judgment: pending fault code ON	
OFF malfunction (A)	
Engine speed	≧ 1st gear ratio x NO + 0 rpm NO: Transmission output speed
(2)	
There are 2 judgments steps/driving cycle 1st judgment step: when following conditions OFF malfunction (B) met, temporary flag becomes ON. It is necessary 2 judgment/driving cycle 2nd judgment step: when following conditions met, pending fault code becomes ON. (OFF malfunction (C), (F) and (H)) or (OFF malfunction (D), (E), (G) and (H))	
OFF malfunction (B)	
NElast – NEcurrent NElast: Engine speed at last ECM selected gear NEcurrent: Engine speed at current ECM selected gear	< 512.5 rpm at throttle valve opening angle 40 % (Condition vary with throttle valve opening angle)
OFF malfunction (C)	
Engine speed	≧ 1st gear ratio x NO + 50 rpm NO: Transmission output speed
OFF malfunction (D)	
Engine speed	≧ 2nd gear ratio x NO + 50 rpm or < 2nd gear ratio x NO – 50 rpm NO: Transmission output speed

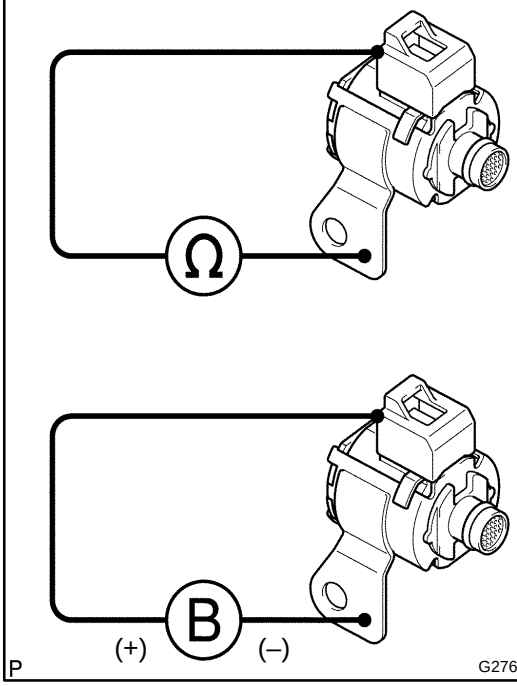
OFF malfunction (E) and (F)	
Engine speed	≧ 3rd gear ratio x NO + 50 rpm or < 3rd gear ratio x NO – 50 rpm NO: Transmission output speed
OFF malfunction (G)	
Engine speed	< 4th gear ratio x NO + 50 rpm and ≧ 4th gear ratio x NO – 50 rpm NO: Transmission output speed
OFF malfunction (H)	
Engine speed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

ON malfunction (F)	
Engine speed	≧ 4th gear ratio x NO + 50 rpm or < 4th gear ratio x NO – 50 rpm NO: Transmission output speed
ON malfunction (G)	
Engine speed	< 3rd gear ratio x NO + 50 rpm and ≧ 3rd gear ratio x NO – 50 rpm NO: Transmission output speed
ON malfunction (H)	
Engine speed	≧ 4th gear ratio x NO + 50 rpm or < 4th gear ratio x NO – 50 rpm NO: Transmission output speed
ON malfunction (I)	
When one of following secondary parameter conditions met, 2nd judgment is stopped.	(See secondary parameters and condition)

INSPECTION PROCEDURE

1	INSPECT SHIFT SOLENOID VALVE(S2)

Shift Solenoid Valve S2:



(a) Remove the shift solenoid valve S2.

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

Standard:

Tester Connection	Specified Condition 20 °C (68 °F)
Solenoid Connector (S2) – Solenoid Body (S2)	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(S2)**

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)