TOYOTA A750/A761/AB60 DIAGNOSING PERFORMANCE DTC'S

DESCRIPTION: Toyota Tundra, 4Runner, Tacoma, Sequoia and FJ Cruiser and Lexus equipped with the A750, A761 or AB60 transmission may exhibit intermittent "Performance" diagnostic trouble codes. These DTC's have very vague descriptions and can cause confusion during diagnoses which typically incurs additional expense because of replacing parts that are good .

DIAGNOSIS: To diagnose a "Performance" trouble code we need to first look up the definition and verify that the description, that is sometimes supplied by the scan tool, is valid. Next, refer to a component application chart that includes solenoid strategy. The next step is the most important , we need a thorough road test so we have a direction as to whether this trouble code is a minor or major repair. Refer to the examples below for diagnosis flow.

A750 - P0751 Performance trouble code Example:

- Refer to Figure 1 for A750 Performance trouble code chart. P0751 indicates that there is a malfunction in Shift Solenoid A or (S1) hydraulic circuit.
- Refer to Figure 2 for a component application chart including solenoid strategy. Study the chart and note that S1 solenoid is On, in the Drive positions, in First and Second gear and Off in Third thru Fifth gears. Also note that in the same application chart that when the S1 solenoid is turned Off the C3 Clutch is applied.
- Road test the vehicle keeping in mind the function of the solenoid and the application of the C3 Clutch.

  After the road test the following questions would need to be answered:

  A. Did it take off in 1st gear, or did it feel like it was taking off in 3rd, and the scan tool shows that S1 is commanded On?

  B. If it took off in 1st, did it shift into 3rd gear?

  C. If it shifted into 3rd, did it slip during the transition?

  D. If it slipped into 3rd does it delay in Reverse?

  -Target areas for questions A and B would be related to a solenoid mechanical/performance issue that is also connected to the 2-3 shift valve train. Refer Figure 3 for a partial schematic and note that this same trouble code can set from a stuck valve.

  -Target areas for questions C and D would be related to the operation and integrity of the C3 Clutch assembly. Note: This same trouble code can set from a C3 Clutch that is not holding or is slipping. Refer to Figure 1 and note that the C3 Clutch is On in Reverse as well as 3rd.

A761/AB60 - P0751 Performance trouble code Example:

- Refer to Figure 4 for A761/AB60 Performance trouble code chart. P0751 indicates that there is a malfunction in Shift Solenoid A or (S1) hydraulic circuit.
- Refer to Figure 5 for a component application chart including solenoid strategy. Study the chart and note that S1 solenoid is Off, in the Drive positions, in First and On in Second thru Sixth gears. Also note that in the same application chart that when the S1 solenoid is turned On the B3 Brake is applied.
- Road test the vehicle keeping in mind the function of the solenoid and the application of the B3 Brake.

  After the road test the following questions would need to be answered:

  A. Did it take off in 1st gear, or did it feel like it was taking off in 2nd, and the command on the scan tool shows the solenoid is commanded Off?

  B. If it took off in 1st did it shift into 2nd gear?

  C. If it shifted into 2nd gear, did it slip during the transition?

  D. If it tried to shift into 2nd gear, did it have a quick cut loose until you let off the throttle and it shifted into 3rd? Then shifted thru the rest of the gears fine.

Continued on next page:

DIAGNOSING PERFORMANCE DTC'S

DIAGNOSIS: Contd.

-Target areas for questions A and B would be related to a solenoid mechanical/performance issue that is also connected to the S1 shift valve train. Refer Figure 6 for a partial schematic and note that this same trouble code can set from a stuck valve.

-Target areas for questions C and D would be related to the operation and integrity of the B3 Brake assembly. Note: This same trouble code can set from a B3 Brake that is not holding or is slipping. Refer to Figure 5 and note that the B3 Brake is On in Second as well as the F2 Freewheel. Problems in the F2 may be better described in question D.

SOLUTION:

Once the diagnosis has been performed the solution is simple based on answering the questions listed in each section. As you can see it is very important to not only have the correct definition of the code but to connect the trouble code to a problem area in the test drive. Once the test drive is completed a target area is unveiled and finally the solution can be performed. Also note that it is very important to have oil circuit diagrams so not only the hydraulic function of the solenoid is observed but the valve and or valves that are connected to the solenoid can be checked . Refer to the ATSG website under our bookstore for hard to get oil circuit diagrams under the heading "Technician Guides."

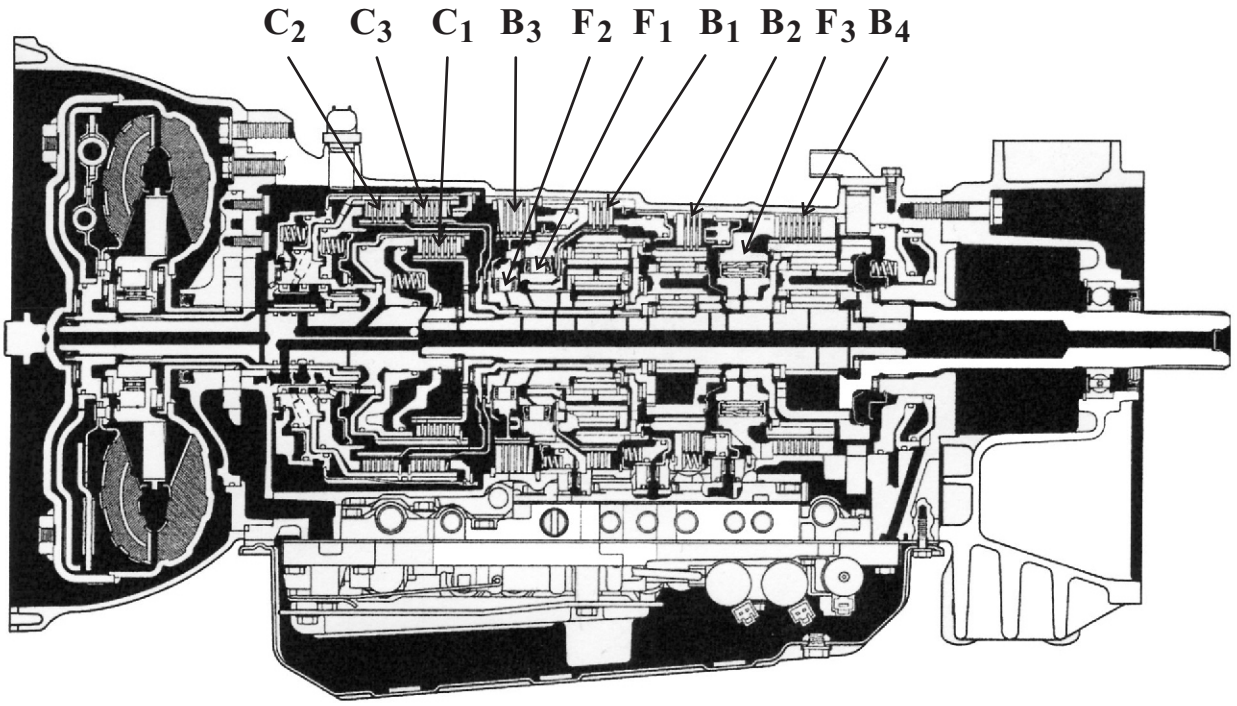
A750 PERFORMANCE DIAGNOSTIC TROUBLE CODE DESCRIPTIONS

DTC	DESCRIPTION	TROUBLE AREAS	E	M	MIL-1	MIL-2
P0751	Shift Solenoid "A" Performance (S1)	Mechanical malfunction in S1 hydraulic circuit		Y	ON	DTC Stored
P0756	Shift Solenoid "B" Performance (S2)	Mechanical malfunction in S2 hydraulic circuit		Y	ON	DTC Stored
P0771	Shift Solenoid "E" Performance (SR)	Mechanical malfunction in SR hydraulic circuit		Y	ON	DTC Stored
P0776	Pressure Control Solenoid "B" performance Fault (SL2)	Mechanical malfunction SL2 hydraulic circuit		Y	ON	DTC Stored
P0781	1-2 Shift valve mechanical fault	Mechanical malfunction related to the 1-2 Shift Valve being stuck		Y	ON	DTC Stored
P2714	Pressure Control Solenoid "D" performance Fault (SLT)	Mechanical malfunction SLT hydraulic circuit		Y	ON	DTC Stored
P2757	TCC Control Solenoid performance Fault (SLU)	Mechanical malfunction SLU hydraulic circuit TCC slip		Y	ON	DTC Stored

E= Electronically generated **M= Mechanically generated**

Figure 1

TOYOTA A750E COMPONENT APPLICATION CHART



Shift Lever Position		Solenoids						Driving Clutches			Brake Clutches				One-Way Clutches		
		S1	S2	SR	SL1	SL2	SLU	C_1	C_2	C_3	B_1	B_2	B_3	B_4	F_1	F_2	F_3
Park		ON				High											
Reverse		ON		**		High	-*-			○	○			○	○		
Neutral		ON				High											
D S5	1st	ON		**	-*-	High	-*-	○									○
	2nd	ON	ON		-*-	High		○					○		○	○	
	3rd		ON		-*-	High	Flex	○		○			●		○		
	4th				-*-	High	Flex	○	○	●			●				
	5th			ON	High		High		○	○	○		●				

** = Pulsed from On to OFF during application

-*- = Pulsed from OFF to High duty cycle to OFF during gear change and engagement of garage shifts (Based on Strategy)

○ = Applied/Operates

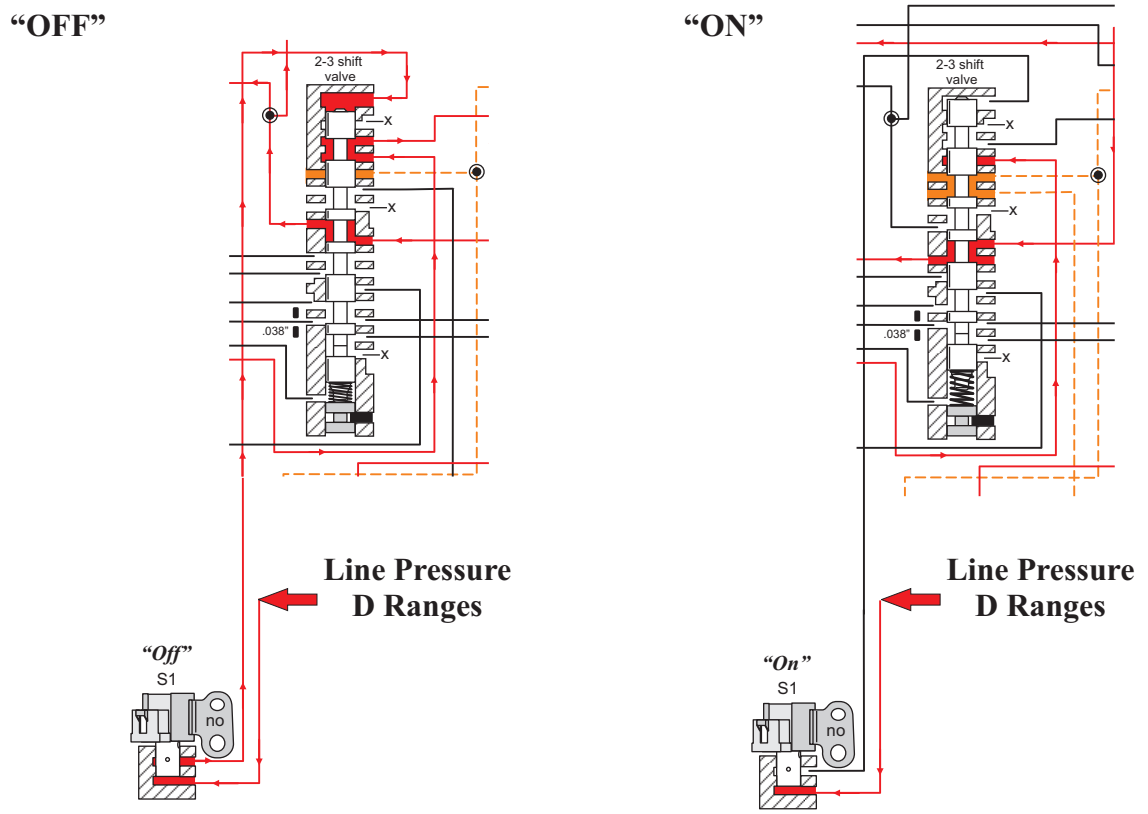
● = Applied but does not transmit power

(○) = Provides engine braking

Flex = Flex TCC strategy, which is low SLU duty cycle partial TCC application

Figure 2

S1 SOLENOID THEORY OF OPERATION



The S1 solenoid is a Normally Open Solenoid, when the solenoid is OFF line pressure from the Manual Valve "D" Ranges, is connected thru the solenoid to the 2-3 Shift Valve. When the Solenoid is ON pressure is blocked to the 2-3 Shift Valve.

Figure 3

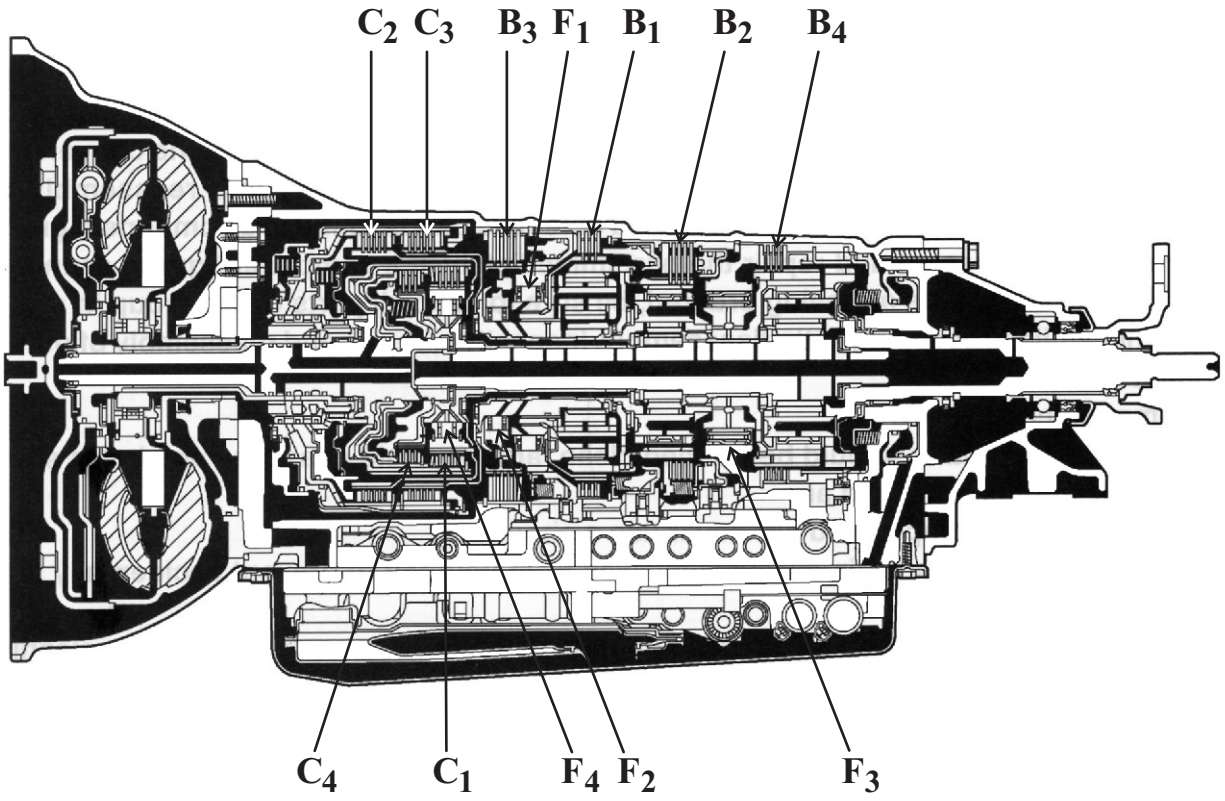
A761/AB60 PERFORMANCE DIAGNOSTIC TROUBLE CODE DESCRIPTIONS

DTC	DESCRIPTION	TROUBLE AREAS	E	M	MIL-1	MIL-2
P0729	Gear 6 Incorrect ratio	Mechanical malfunction in Valve Body or Clutch		Y	ON	DTC Stored
P0751	Shift Solenoid "A" Performance (S1)	Mechanical malfunction in S1 hydraulic circuit, Clutch or Brake malfunction		Y	ON	DTC Stored
P0756	Shift Solenoid "B" Performance (S2)	Mechanical malfunction in S2 hydraulic circuit		Y	ON	DTC Stored
P0761	Shift Solenoid "C" Performance (S3)	Mechanical malfunction in S3 hydraulic circuit		Y	ON	DTC Stored
P0766	Shift Solenoid "D" Performance (S4)	Mechanical malfunction in S4 hydraulic circuit		Y	ON	DTC Stored
P0776	Pressure Control Solenoid "B" performance Fault (SL2)	Mechanical malfunction SL2 hydraulic circuit		Y	ON	DTC Stored
P0781	1-2 Shift valve mechanical fault	Mechanical malfunction related to the 1-2 Shift Valve being stuck		Y	ON	DTC Stored
P0894	Transmission Component Slipping	Mechanical malfunction in Valve Body, Clutch and or Brake		Y	ON	DTC Stored
P2714	Pressure Control Solenoid "D" performance Fault (SLT)	Mechanical malfunction SLT hydraulic circuit		Y	ON	DTC Stored
P2757	TCC Control Solenoid performance Fault (SLU)	Mechanical malfunction SLU hydraulic circuit TCC slip		Y	ON	DTC Stored

E= Electronically generated **M= Mechanically generated**

Figure 4

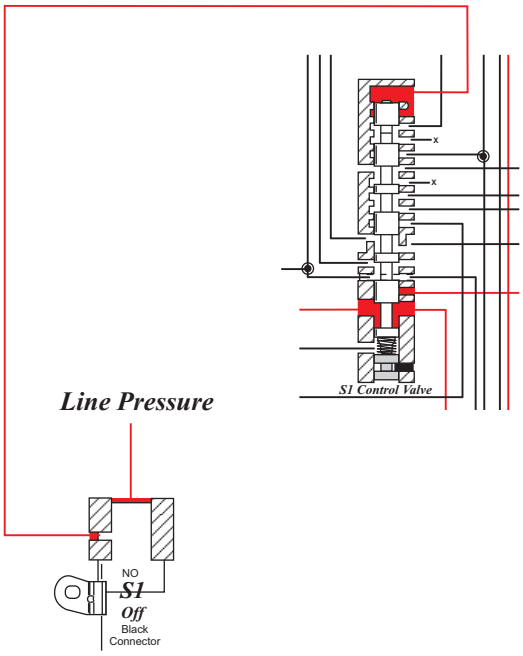
TOYOTA/LEXUS A761E APPLICATION CHART



Shift Lever Position		Solenoids								Driving Clutches				Brake Clutches				One-Way Clutches			
		S1	S2	S3	S4	SR	SL1	SL2	SLU	C_1	C_2	C_3	C_4	B_1	B_2	B_3	B_4	F_1	F_2	F_3	F_4
Park			ON	ON		ON		ON													
Reverse			ON	ON		ON		ON				○		○			○	○			
Neutral			ON	ON		ON		ON													
D S (6)	1st		ON	ON		ON		ON		○			○							○	○
	2nd	ON	ON	ON		ON		ON	ON	○			○			○		○	○		○
	3rd	ON		ON		ON		ON	ON	○		○	○			●		○			○
	4th	ON				ON		ON	ON	○	○	●	○			●					○
	5th	ON			ON		ON		ON	●	○	○		○		●					
	6th	ON	ON		ON		ON		ON	●	○			●	○	●					

Figure 5

S1 SOLENOID THEORY OF OPERATION



The S1 solenoid is a Normally Open Solenoid, when the solenoid is OFF line pressure is connected thru the solenoid to the S1 Control valve. When the Solenoid is ON pressure is blocked to the S1 Control Valve.

Figure 6