

1999 MY for Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve SL) Monitor (P0770)

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MONITOR STRATEGY

Required sensors/Components	Main	Shift solenoid valve SL (DSL)
	Sub	None
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 In-39	
Engine family	Item	Specification	
		Minimum	Maximum
5E-FE (TERCEL, PASEO)	Condition (A)		
	Intake air temperature	-10 °C (14 °F) or more	Less than 70 °C (158 °F)
	Engine coolant	60 °C (140 °F) or more	Less than 105 °C (221 °F)
	Transmission range	"D"	
	Battery voltage	10 V or more	-
	Spark retard by KCS control	-	Less than 10° CA
	OFF malfunction		
	ECM selected gear	4th with lock up	
	ON malfunction		
	ECM selected gear	4th	
	Throttle valve opening angle	7 % or more	-

Component T/M Outputs – Solenoid

1ZZ-FE (COROLLA)	Condition (A)		
	Intake air temperature	-10 °C (14 °F) or more	Less than 70 °C (158 °F)
	Engine coolant	55 °C (131 °F) or more	Less than 105 °C (221 °F)
	Transmission range	"D"	
	Battery voltage	10 V or more	-
	Spark retard by KCS control	9° CA or more	-
	OFF malfunction		
	ECM selected gear	4th with lock up	
	ON malfunction		
	ECM selected gear	4th	
	Throttle valve opening angle	7 % or more	-
5S-FE (CELICA)	Condition (A)		
	Intake air temperature	-10 °C (14 °F) or more	Less than 70 °C (158 °F)
	Engine coolant	60 °C (140 °F) or more	Less than 105 °C (221 °F)
	Transmission range	"D"	
	Battery voltage	10 V or more	-
	Spark retard by KCS control	-	Less than 9° CA
	OFF malfunction		
	ECM selected gear	4th with lock up	
	ON malfunction		
	ECM selected gear	4th	
	Throttle valve opening angle	7 % or more	-
1MZ-FE (SIENNA)	Condition (A)		
	Intake air temperature	-10 °C (14 °F) or more	Less than 70 °C (158 °F)
	Engine coolant	60 °C (140 °F) or more	Less than 105 °C (221 °F)
	Transmission range	"D"	
	Battery voltage	10 V or more	-
	Spark retard by KCS control	-	Less than 10° CA
	OFF malfunction		
	ECM selected gear	4th with lock up	
	ON malfunction		
	ECM selected gear	4th	
	Throttle valve opening angle	7 % or more	-
5S-FE (CAMRY, CAMRY SOLA- RA)	Condition (A)		
	Intake air temperature	-10 °C (14 °F) or more	Less than 70 °C (158 °F)
	Engine coolant	60 °C (140 °F) or more	Less than 105 °C (221 °F)
	Transmission range	"D"	
	Spark retard by KCS control	-	Less than 10° CA
	OFF malfunction		
	ECM selected gear	4th with lock up	
	ON malfunction		
	ECM selected gear	4th	
	Throttle valve opening angle	7 % or more	-

1MZ-FE (CAMRY, CAMRY SOLARA, AVALON)	Condition (A)		
	Engine coolant	60 °C (140 °F) or more	—
	Vehicle speed	25 km/h (16 mph) or more	—
	Transmission range	"D"	
	OFF malfunction		
	ECM lock-up command	ON	
	Actual gear	3rd or 4th	
	Actual gear at 2nd gear selected	Except 1st	
	ON malfunction		
	ECM lock-up command	OFF	
	Actual gear	3rd	
	Throttle valve opening angle	8 % or more	—
	Vehicle speed	—	Less than 60 km/h (37 mph)
	1MZ-FE (ES300)	Condition (A)	
Engine coolant		60 °C (140 °F) or more	—
Transmission range		"D"	
Transmission fluid temperature		−20 °C (−4 °F) or more	—
OFF malfunction			
ECM lock-up command		ON	
ECM selected gear		3rd or 4th	
Actual gear		3rd or 4th	
Vehicle speed		25 km/h (16 mph) or more	—
ON malfunction			
ECM lock-up command		OFF	
ECM selected gear		3rd or 4th	
Actual gear		3rd or 4th	
Throttle valve opening angle		8 % or more	—
Vehicle speed		—	Less than 60 km/h (37 mph)
1MZ-FE (RX300)		Condition (A)	
	Engine coolant	60 °C (140 °F) or more	—
	Transmission range	"D"	
	Transmission fluid temperature	−20 °C (−4 °F) or more	—
	OFF malfunction		
	ECM lock-up command	ON	
	Actual gear	3rd	
	ON malfunction		
	ECM lock-up command	OFF	
	Actual gear	3rd	
	Throttle valve opening angle	8 % or more	—
	Vehicle speed	—	Less than 60 km/h (37 mph)

Component T/M Outputs – Solenoid

2JZ-GE (GS300), 1UZ-FE (LS400, GS400, SC400)	Condition (A)		
	Intake air temperature	-10 °C (14 °F) or more	Less than 90 °C (194 °F)
	Engine coolant	40 °C (104 °F) or more	-
	Vehicle speed	25 km/h (16 mph) or more	-
	Transmission range	"D"	
	Spark retard by KCS control	10° CA or more	
	OFF malfunction		
	ECM lock-up command	ON	
	Actual gear	4th	
	Actual gear at 3rd gear selected	Except 1st	
	Vehicle speed	-	Less than 100 km/h (62 mph)
	ON malfunction		
	ECM lock-up command	OFF (duty ratio 10 % or more)	
	Actual gear	4th	
	Throttle valve opening angle	9 % or more	-
	Vehicle speed	-	Less than 60 km/h (37 mph)
2JZ-GE (SC300)	Condition (A)		
	Intake air temperature	-10 °C (14 °F) or more	Less than 90 °C (194 °F)
	Engine coolant	40 °C (104 °F) or more	-
	Vehicle speed	25 km/h (16 mph) or more	-
	Transmission range	"D"	
	Spark retard by KCS control	10° CA or more	-
	OFF malfunction		
	ECM lock-up command	ON	
	Actual gear	4th	
	Actual gear at 3rd gear selected	Except 1st	
	Vehicle speed	-	Less than 100 km/h (62 mph)
	ON malfunction		
	ECM lock-up command	OFF	
	Actual gear	3rd	
	Throttle valve opening angle	10 % or more	-
	Vehicle speed	-	Less than 60 km/h (37 mph)
3S-FE (RAV4/2WD)	Condition (A)		
	Intake air temperature	-10 °C (14 °F) or more	Less than 70 °C (158 °F)
	Engine coolant	60 °C (140 °F) or more	Less than 105 °C (221 °F)
	Transmission range	"D"	
	Battery voltage	10 V or more	-
	Spark retard by KCS control	10° CA or more	-
	OFF malfunction		
	ECM selected gear	4th with lock up	
	ON malfunction		
	ECM selected gear	4th	
	Throttle valve opening angle	7 % or more	-

3S-FE (RAV4/4WD)	Condition (A)		
	Intake air temperature	-10 °C (14 °F) or more	Less than 70 °C (158 °F)
	Engine coolant	60 °C (140 °F) or more	Less than 105 °C (221 °F)
	Transmission range	"D"	
	Battery voltage	10 V or more	-
	Spark retard by KCS control	10° CA or more	-
	OFF malfunction		
	ECM selected gear	4th with lock up	
	ON malfunction		
	ECM selected gear	4th	
	Throttle valve opening angle	7 % or more	-
3RZ-FE (TACOMA)	Condition (A)		
	Intake air temperature	-10 °C (14 °F) or more	Less than 90 °C (194 °F)
	Engine coolant	55 °C (131 °F) or more	Less than 105 °C (221 °F)
	Transmission range	"D"	
	Battery voltage	10 V or more	-
	Spark retard by KCS control	-	Less than 10° CA
	Transfer range "Hi" [4WD]		
	Throttle valve opening angle	0 % or more	-
	Vehicle speed	5 km/h (3 mph) or more	-
	Transmission fluid temperature	-	Less than 130 °C (226 °F) (hysteresis 110 °C (230 °F))
	OFF malfunction		
	ECM selected gear	4th with lock up	
	ON malfunction		
	ECM selected gear	4th	
	Throttle valve opening angle	12 % or more	-
3RZ-FE (Prerunner, 4RUNNER)	Condition (A)		
	Intake air temperature	-10 °C (14 °F) or more	Less than 90 °C (194 °F)
	Engine coolant	55 °C (131 °F) or more	Less than 105 °C (221 °F)
	Transmission range	"D"	
	Battery voltage	10 V or more	-
	Spark retard by KCS control	-	Less than 10° CA
	Transfer range "Hi" [4WD]		
	Throttle valve opening angle	0 % or more	-
	Vehicle speed	5 km/h (3 mph) or more	-
	Transmission fluid temperature	-	Less than 130 °C (226 °F) (hysteresis 110 °C (230 °F))
	OFF malfunction		
	ECM selected gear	4th with lock up	
	ON malfunction		
	ECM selected gear	4th	

Component T/M Outputs – Solenoid

5VZ-FE (TACOMA, 4RUNNER)	Condition (A)			
	Intake air temperature	-10 °C (14 °F) or more	Less than 70 °C (158 °F)	
	Engine coolant	60 °C (140 °F) or more	Less than 105 °C (221 °F)	
	Transmission range	"D"		
	Battery voltage	10 V or more	-	
	Spark retard by KCS control	-	Less than 10° CA	
	Transfer range "Hi"[4WD]			
	Throttle valve opening angle	0 % or more		
	Vehicle speed	5 km/h (3 mph) or more	-	
	Transmission fluid temperature	-	Less than 130 °C (226 °F) (hysteresis 110 °C (230 °F))	
	OFF malfunction			
	Actual gear	4th with lock up		
	ON malfunction			
	ECM selected gear	4th		
5VZ-FE (Prerunner/2WD)	Condition (A)			
	Intake air temperature	-10 °C (14 °F) or more	Less than 70 °C (158 °F)	
	Engine coolant	60 °C (140 °F) or more	Less than 105 °C (221 °F)	
	Transmission range	"D"		
	Battery voltage	10 V or more	-	
	Spark retard by KCS control	-	Less than 8° CA	
	Transmission fluid temperature	-	Less than 130 °C (226 °F) (hysteresis 110 °C (230 °F))	
	OFF malfunction			
	ECM selected gear	4th with lock up		
	ON malfunction			
	ECM selected gear	4th		
	Throttle valve opening angle	7 % or more	-	
	2UZ-FE (LAND CRUISER, LX470)	Condition (A)		
		Intake air temperature	-10 °C (14 °F) or more	Less than 90 °C (194 °F)
Engine coolant		40 °C (104 °F) or more	-	
Transmission range		"D"		
Transfer range "Hi"[4WD]				
Throttle valve opening angle		0 % or more		
Vehicle speed		5 km/h (3 mph) or more	-	
Transmission fluid temperature		-	Less than 130 °C (226 °F) (hysteresis 110 °C (230 °F))	
OFF malfunction				
ECM lock-up command		ON		
Actual gear		4th		
Actual gear at 3rd gear selected		Except 1st		
Vehicle speed		-	Less than 100 km/h (62 mph)	
ON malfunction				
ECM lock-up command		OFF		
Actual gear		3rd		
Throttle valve opening angle		9 % or more		
Vehicle speed		-	Less than 60 km/h (37 mph)	

1996–2003 ADDITION OF OBD (OTH021U)

TYPICAL MALFUNCTION THRESHOLDS

Engine family	Detection criteria	Threshold
5E-FE, 5S-FE, 1ZZ-FE (COROLLA), 1MZ-FE (SIENNA), 3S-FE (RAV4/4-2WD), 3RZ-FE, 5VZ-FE	(A) & OFF malfunction	
	Engine speed	$\geq$ 4th gear ratio x NO + 100 rpm < 3rd gear ratio x NO – 100 rpm
	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & ON malfunction	
	Engine speed	$\geq$ 4th gear ratio x NO – 50 rpm < 4th gear ratio x NO + 50 rpm
1MZ-FE (CAMRY, CAMRY SOLARA)	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & OFF malfunction	
	Engine speed – Input speed (NE – NC2)	200 rpm or more
	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & ON malfunction	
1MZ-FE (AVALON)	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & OFF malfunction	
	Engine speed – Input speed (NE – NC2)	130 rpm or more
	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & ON malfunction	
1MZ-FE (ES300)	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & OFF malfunction	
	Engine speed – Input speed (NE – NT)	100 rpm or more
	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & ON malfunction	
1MZ-FE (ES300)	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & OFF malfunction	
	Engine speed – Input speed (NE – NT)	100 rpm or more
	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & ON malfunction	
	Engine speed – Input speed (NE – NT)	Less than 35 rpm

Component T/M Outputs – Solenoid

1MZ-FE (RX300)	(A) & OFF malfunction	
	Engine speed – Input speed (NE – NT)	200 rpm or more
	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & ON malfunction	
	Engine speed – Input speed (NE – NT)	Less than 35 rpm
2JZ-GE (GS300)	(A) & OFF malfunction	
	Engine speed – output speed x 5th gear ratio (NE – NO x 5th gear ratio)	150 rpm or more
	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & ON malfunction	
	Engine speed – Input speed (NE – NC0)	Less than 35 rpm
2JZ-GE (SC300)	(A) & OFF malfunction	
	Engine speed – output speed x 4th gear ratio (NE – NO x 4th gear ratio)	150 rpm or more
	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & ON malfunction	
	Engine speed – Input speed (NE – NC0)	Less than 70 rpm
1UZ-FE (LS400, GS400, SC400)	(A) & OFF malfunction	
	Engine speed – output speed x 5th gear ratio (NE – NO x 5th gear ratio)	70 rpm or more
	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & ON malfunction	
	Engine speed – Input speed (NE – NC0)	Less than 35 rpm
2UZ-FE (LAND CRUISER, LX470)	(A) & OFF malfunction	
	Engine speed – Transmission output speed x 4th gear ratio (NE – NO x 4th gear ratio)	70 rpm or more
	It is necessary 2 judgments/driving cycle 1st judgment; temporary flag ON 2nd judgment; pending fault code ON	
	(A) & ON malfunction	
	Engine speed – Input shaft speed (NE – NC0)	Less than 35 rpm