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Model Year: 2008	Model: LX570	Doc ID: RM000000O8L089X
Title: AB60F AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: FAIL-SAFE CHART (2008 LX570)		

FAIL-SAFE CHART

1. Fail-safe

This function minimizes the loss of the ECT functions when a malfunction occurs in each sensor or shift solenoid valve.

2. Fail-safe Control List

MALFUNCTIONING PART	FUNCTION
DTC P0717: Input Speed Sensor NT	During an input speed sensor malfunction, shift control is performed through the output speed sensor SP2 signal. During an input speed sensor malfunction, up-shift to 5th and 6th, AI-SHIFT* and flex lock-up clutch control are prohibited.
DTC P0722: Output Speed Sensor SP2	During an output speed sensor malfunction, shift control is performed through the input speed sensor NT signal. During an output speed sensor malfunction, up-shift to 5th and 6th, AI-SHIFT* and flex lock-up clutch control are prohibited.
DTC P0710, P0712, P0713: ATF Temperature Sensor	During an ATF temperature sensor malfunction, up-shift to 5th and 6th and flex lock-up clutch control are prohibited.
Shift Solenoid Valve S1, S2, S3, S4 and SR	The current to the malfunctioning shift solenoid valve is cut off and control is performed by operating the other shift solenoid valves. Shift control is performed depending on the malfunctioning shift solenoid valve as described in the table below.
DTC P0748, P0778: Shift Solenoid Valve SL1 and SL2	During a shift solenoid valve SL1 or SL2 malfunction, up-shift to 5th and 6th and flex lock-up clutch control are prohibited.
DTC P2714, P2716: Shift Solenoid Valve SLT	During a shift solenoid valve SLT malfunction, the current to the shift solenoid valve is stopped. This stops line pressure optimal control, and shift shock increases. However, shifting is performed through normal clutch pressure control.
DTC P2757, P2759: Shift Solenoid Valve SLU	During a shift solenoid valve SLU malfunction, the current to the shift solenoid valve is stopped. This stops lock-up control and flex lock-up control, and fuel economy decreases.

HINT:

***: In addition to the switching of the shift pattern through the pattern select switch, Artificial Intelligence Shift (AI-SHIFT) control enables the ECM to estimate the road conditions and the driver intention in order to automatically select the optimal shift pattern.**

Shift Solenoid Valve Normal Operation Chart

SHIFT LEVER POSITION	GEAR*	SHIFT SOLENOID VALVE S1	SHIFT SOLENOID VALVE S2	SHIFT SOLENOID VALVE S3	SHIFT SOLENOID VALVE S4	SHIFT SOLENOID VALVE SR	SHIFT SOLENOID VALVE SL1	SHIFT SOLENOID VALVE SL2
D, S6	1st	OFF	ON	ON	OFF	ON	OFF	ON

SHIFT LEVER POSITION	GEAR*	SHIFT SOLENOID VALVE S1	SHIFT SOLENOID VALVE S2	SHIFT SOLENOID VALVE S3	SHIFT SOLENOID VALVE S4	SHIFT SOLENOID VALVE SR	SHIFT SOLENOID VALVE SL1	SHIFT SOLENOID VALVE SL2
	3rd	ON	OFF	ON	OFF	ON	OFF	ON
	4th	ON	OFF	OFF	OFF	ON	OFF	ON
	5th	ON	OFF	OFF	ON	OFF	ON	OFF
	6th	ON	ON	OFF	ON	OFF	ON	OFF
S5	1st	OFF	ON	ON	OFF	ON	OFF	ON
	2nd	ON	ON	ON	OFF	ON	OFF	ON
	3rd	ON	OFF	ON	OFF	ON	OFF	ON
	4th	ON	OFF	OFF	OFF	ON	OFF	ON
	5th	ON	OFF	OFF	ON	OFF	ON	OFF
S4	1st	OFF	ON	ON	OFF	ON	OFF	ON
	2nd	ON	ON	ON	OFF	ON	OFF	ON
	3rd	ON	OFF	ON	OFF	ON	OFF	ON
	4th	ON	OFF	OFF	OFF	ON	OFF	ON
S3	1st	OFF	ON	ON	OFF	ON	OFF	ON
	2nd	ON	ON	ON	OFF	ON	OFF	ON
	3rd (E/B)	ON	OFF	ON	OFF	ON	OFF	OFF
S2	1st	OFF	ON	ON	OFF	ON	OFF	ON
	2nd (E/B)	ON	ON	ON	ON	ON	OFF	OFF
S1	1st (E/B)	OFF	ON	ON	OFF	ON	OFF	OFF

(a) Fail-safe operation for electronically malfunctioning shift solenoid valve (S1, S2, S3, S4 and SR).

(1) Fail-safe function

If any of the shift solenoid valve circuits has an open or short failure, the ECM turns the other shift solenoid valves "ON" and "OFF" in order to shift into the gear positions shown in the table below. Also, the ECM stops sending current to the open or short circuited solenoid.

Even if starting the engine again in the fail-safe mode, the gear position remains in the same position.

HINT:

- *: Actual gear shift (gear position) under fail-safe operation.
- X: OFF (the ECM stops sending current to the malfunctioning shift solenoid valve).
- Electrical malfunction: Condition is shown to the left of the "→".
- Fail-safe mode: Condition is shown to the right of the "→".
- E/B: Engine brake

Shift Solenoid Valve S1 Electrical Malfunction (P0973, P0974)

SHIFT LEVER POSITION	GEAR*	SHIFT SOLENOID VALVE S1	SHIFT SOLENOID VALVE S2	SHIFT SOLENOID VALVE S3	SHIFT SOLENOID VALVE S4	SHIFT SOLENOID VALVE SR	SHIFT SOLENOID VALVE SL1	SHIFT SOLENOID VALVE SL2
D, S6	1st	X	ON	ON	OFF	ON	OFF	ON
	1st → 4th	X	ON → OFF	ON → OFF	OFF	ON	OFF	ON

SHIFT LEVER POSITION	GEAR*	SHIFT SOLENOID VALVE S1	SHIFT SOLENOID VALVE S2	SHIFT SOLENOID VALVE S3	SHIFT SOLENOID VALVE S4	SHIFT SOLENOID VALVE SR	SHIFT SOLENOID VALVE SL1	SHIFT SOLENOID VALVE SL2
	3rd → 4th	X	OFF	ON → OFF	OFF	ON	OFF	ON
	4th	X	OFF	OFF	OFF	ON	OFF	ON
	5th	X	OFF	OFF	ON	OFF	ON	OFF
	N → 5th	X	ON → OFF	OFF	ON	OFF	ON	OFF
S5	1st	X	ON	ON	OFF	ON	OFF	ON
	1st → 4th	X	ON → OFF	ON → OFF	OFF	ON	OFF	ON
	3rd → 4th	X	OFF	ON → OFF	OFF	ON	OFF	ON
	4th	X	OFF	OFF	OFF	ON	OFF	ON
	5th	X	OFF	OFF	ON	OFF	ON	OFF
S4	1st	X	ON	ON	OFF	ON	OFF	ON
	1st → 4th	X	ON → OFF	ON → OFF	OFF	ON	OFF	ON
	3rd → 4th	X	OFF	ON → OFF	OFF	ON	OFF	ON
	4th	X	OFF	OFF	OFF	ON	OFF	ON
S3	1st	X	ON	ON	OFF	ON	OFF	ON
	1st → 4th	X	ON → OFF	ON → OFF	OFF	ON	OFF	ON
	3rd (E/B) → 4th	X	OFF	ON → OFF	OFF	ON	OFF	OFF → ON
S2	1st	X	ON	ON	OFF	ON	OFF	ON
	2nd (E/B) → 4th	X	ON → OFF	ON → OFF	ON → OFF	ON	OFF	OFF → ON
S1	1st (E/B)	X	ON	ON	OFF	ON	OFF	OFF

Shift Solenoid Valve S2 Electrical Malfunction (P0976, P0977)

SHIFT LEVER POSITION	GEAR*	SHIFT SOLENOID VALVE S1	SHIFT SOLENOID VALVE S2	SHIFT SOLENOID VALVE S3	SHIFT SOLENOID VALVE S4	SHIFT SOLENOID VALVE SR	SHIFT SOLENOID VALVE SL1	SHIFT SOLENOID VALVE SL2
D, S6	3rd	OFF → ON	X	ON	OFF	ON	OFF	ON
	3rd	ON	X	ON	OFF	ON	OFF	ON
	3rd	ON	X	ON	OFF	ON	OFF	ON
	4th	ON	X	OFF	OFF	ON	OFF	ON
	5th	ON	X	OFF	ON	OFF	ON	OFF

SHIFT LEVER POSITION	GEAR*	SHIFT SOLENOID VALVE S1	SHIFT SOLENOID VALVE S2	SHIFT SOLENOID VALVE S3	SHIFT SOLENOID VALVE S4	SHIFT SOLENOID VALVE SR	SHIFT SOLENOID VALVE SL1	SHIFT SOLENOID VALVE SL2
	5th	ON	X	OFF	ON	OFF	ON	OFF
S5	3rd	OFF → ON	X	ON	OFF	ON	OFF	ON
	3rd	ON	X	ON	OFF	ON	OFF	ON
	3rd	ON	X	ON	OFF	ON	OFF	ON
	4th	ON	X	OFF	OFF	ON	OFF	ON
	5th	ON	X	OFF	ON	OFF	ON	OFF
S4	3rd	OFF → ON	X	ON	OFF	ON	OFF	ON
	3rd	ON	X	ON	OFF	ON	OFF	ON
	3rd	ON	X	ON	OFF	ON	OFF	ON
	4th	ON	X	OFF	OFF	ON	OFF	ON
S3	3rd → 3rd (E/B)	OFF → ON	X	ON	OFF	ON	OFF	ON → OFF
	3rd → 3rd (E/B)	ON	X	ON	OFF	ON	OFF	ON → OFF
	3rd (E/B)	ON	X	ON	OFF	ON	OFF	OFF
S2	3rd → 3rd (E/B)	OFF → ON	X	ON	OFF	ON	ON → OFF	ON → OFF
	3rd (E/B)	ON	X	ON	ON → OFF	ON	OFF	OFF
S1	3rd (E/B)	OFF → ON	X	ON	OFF	ON	OFF	OFF

Shift Solenoid Valve S3 Electrical Malfunction (P0979, P0980)

SHIFT LEVER POSITION	GEAR*	SHIFT SOLENOID VALVE S1	SHIFT SOLENOID VALVE S2	SHIFT SOLENOID VALVE S3	SHIFT SOLENOID VALVE S4	SHIFT SOLENOID VALVE SR	SHIFT SOLENOID VALVE SL1	SHIFT SOLENOID VALVE SL2
D, S6	3rd → 4th	OFF	ON	X	OFF	ON	OFF	ON
	4th	ON	ON → OFF	X	OFF	ON	OFF	ON
	4th	ON	OFF	X	OFF	ON	OFF	ON
	4th	ON	OFF	X	OFF	ON	OFF	ON
	5th	ON	OFF	X	ON	OFF	ON	OFF
	6th	ON	ON	X	ON	OFF	ON	OFF
S5	3rd	OFF	ON	X	OFF	ON	OFF	ON
	4th	ON	ON → OFF	X	OFF	ON	OFF	ON
	4th	ON	OFF	X	OFF	ON	OFF	ON
	4th	ON	OFF	X	OFF	ON	OFF	ON

SHIFT LEVER	GEAR* 5th	SHIFT ON SOLENOID	SHIFT OFF SOLENOID	SHIFT X SOLENOID	SHIFT ON SOLENOID	SHIFT OFF SOLENOID	SHIFT ON SOLENOID	SHIFT OFF SOLENOID
POSITION	3rd	VALVE S1	VALVE S2	VALVE S3	VALVE S4	VALVE SR	VALVE SL1	VALVE SL2
S4	4th	ON	ON → OFF	X	OFF	ON	OFF	ON
	4th	ON	OFF	X	OFF	ON	OFF	ON
	4th	ON	OFF	X	OFF	ON	OFF	ON
S3	3rd	OFF	ON	X	OFF	ON	OFF	ON
	4th	ON	ON → OFF	X	OFF	ON	OFF	ON
	4th	ON	OFF	X	OFF	ON	OFF	OFF → ON
S2	3rd	OFF	ON	X	OFF	ON	OFF	ON
	6th → 4th	ON	ON → OFF	X	ON → OFF	ON	OFF	OFF → ON
S1	1st	OFF	ON	X	OFF	ON	OFF	OFF

Shift Solenoid Valve S4 Electrical Malfunction (P0982, P0983)

SHIFT LEVER POSITION	GEAR*	SHIFT SOLENOID VALVE S1	SHIFT SOLENOID VALVE S2	SHIFT SOLENOID VALVE S3	SHIFT SOLENOID VALVE S4	SHIFT SOLENOID VALVE SR	SHIFT SOLENOID VALVE SL1	SHIFT SOLENOID VALVE SL2
D, S6	1st	OFF	ON	ON	X	ON	OFF	ON
	2nd	ON	ON	ON	X	ON	OFF	ON
	3rd	ON	OFF	ON	X	ON	OFF	ON
	4th	ON	OFF	OFF	X	ON	OFF	ON
	4th	ON	OFF	OFF	X	OFF → ON	ON → OFF	OFF → ON
	4th	ON	ON → OFF	OFF	X	OFF → ON	ON → OFF	OFF → ON
S5	1st	OFF	ON	ON	X	ON	OFF	ON
	2nd	ON	ON	ON	X	ON	OFF	ON
	3rd	ON	OFF	ON	X	ON	OFF	ON
	4th	ON	OFF	OFF	X	ON	OFF	ON
	4th	ON	OFF	OFF	X	OFF → ON	ON → OFF	OFF → ON
S4	1st	OFF	ON	ON	X	ON	OFF	ON
	2nd	ON	ON	ON	X	ON	OFF	ON
	3rd	ON	OFF	ON	X	ON	OFF	ON
	4th	ON	OFF	OFF	X	ON	OFF	ON
S3	1st	OFF	ON	ON	X	ON	OFF	ON
	2nd	ON	ON	ON	X	ON	OFF	ON
	3rd (E/B)	ON	OFF	ON	X	ON	OFF	OFF
S2	1st	OFF	ON	ON	X	ON	OFF	ON
	2nd (E/B)	ON	ON	ON	X	ON	OFF	OFF

SHIFT LEVER POSITION	GEAR*	SHIFT SOLENOID VALVE S1	SHIFT SOLENOID VALVE S2	SHIFT SOLENOID VALVE S3	SHIFT SOLENOID VALVE S4	SHIFT SOLENOID VALVE SR	SHIFT SOLENOID VALVE SL1	SHIFT SOLENOID VALVE SL2
S1	1st (E/B)	OFF	ON	ON	X	ON	OFF	OFF

Shift Solenoid Valve SR Electrical Malfunction (P0985, P0986)

SHIFT LEVER POSITION	GEAR*	SHIFT SOLENOID VALVE S1	SHIFT SOLENOID VALVE S2	SHIFT SOLENOID VALVE S3	SHIFT SOLENOID VALVE S4	SHIFT SOLENOID VALVE SR	SHIFT SOLENOID VALVE SL1	SHIFT SOLENOID VALVE SL2
D, S6	1st	OFF	ON	ON	OFF	X	OFF	ON
	2nd	ON	ON	ON	OFF	X	OFF	ON
	3rd	ON	OFF	ON	OFF	X	OFF	ON
	4th	ON	OFF	OFF	OFF	X	OFF	ON
	5th	ON	OFF	OFF	ON	X	ON	OFF
	6th	ON	ON	OFF	ON	X	ON	OFF
S5	1st	OFF	ON	ON	OFF	X	OFF	ON
	2nd	ON	ON	ON	OFF	X	OFF	ON
	3rd	ON	OFF	ON	OFF	X	OFF	ON
	4th	ON	OFF	OFF	OFF	X	OFF	ON
	5th	ON	OFF	OFF	ON	X	ON	OFF
S4	1st	OFF	ON	ON	OFF	X	OFF	ON
	2nd	ON	ON	ON	OFF	X	OFF	ON
	3rd	ON	OFF	ON	OFF	X	OFF	ON
	4th	ON	OFF	OFF	OFF	X	OFF	ON
S3	1st	OFF	ON	ON	OFF	X	OFF	ON
	2nd	ON	ON	ON	OFF	X	OFF	ON
	3rd (E/B)	ON	OFF	ON	OFF	X	OFF	OFF
S2	1st	OFF	ON	ON	OFF	X	OFF	ON
	2nd (E/B)	ON	ON	ON	ON	X	OFF	OFF
S1	1st (E/B)	OFF	ON	ON	OFF	X	OFF	OFF

(b) Fail-safe operation in the event of a mechanical system malfunction.

(1) Fail-safe function

The ECM controls the gear position as shown in the table below when malfunctions occur.

DTC CODE	CONDITION	GEAR*1					
-	Normal	1st	2nd	3rd	4th	5th	6th
P0751	Shift solenoid valve S1: Stuck OFF malfunction	1st*2	1st*2	3rd	3rd	3rd	3rd

DTC	CONDITION	GEAR*1					
P0766	Shift solenoid valve S3: Stuck ON malfunction	1st	2nd	3rd	3rd	3rd	3rd
P0766 P0776	Shift solenoid valve S4, shift solenoid valve SL2 or valve body (brake control valve): Malfunction	1st	2nd	3rd	3rd	3rd	3rd
P0781	Valve body (1-2 shift valve): Malfunction	1st*2	1st*2	3rd	3rd	3rd	3rd
P0729	Valve body (sequence valve): Malfunction	1st	2nd	3rd	3rd	3rd	3rd

HINT:

- *1: Actual gear shift (gear position) under fail-safe operation.
- *2: Under engine braking, downshifting to 1st or 2nd gear is prohibited.

