05M20–02

FAIL–SAFE CHART

1. FAIL–SAFE

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

Malfunction Part	Function
Output Speed Sensor (SP2)	During an output speed sensor malfunction, shift control is effected through the input speed sensor signal (NT).
ATF Temp. Sensor No. 1	During an ATF temperature sensor No. 1 malfunction, up–shift to the 5th and flex lock–up clutch control are prohibited.
Shift Solenoid Valve S1, S2 and SR	The current to the failed solenoid valve is cut off and control is effected by operating the other solenoid valves with normal operation. Shift control is effected depending on the failed solenoid as described in the table on the next page.
Shift Solenoid Valve SL1 and SL2	During a solenoid valve SL1 or SL2 malfunction, up–shift to the 5th is prohibited.
Shift Solenoid Valve SLU	During a solenoid valve SLU malfunction, the current to the solenoid valve is stopped. This stops lock–up control and flex lock–up control, fuel economy decreases.
Shift Solenoid Valve SLT	During a solenoid valve SLT malfunction, the current to the solenoid valve is stopped. This stops line pressure optimal control, the shift shock increases. However, shifting is effected through normal clutch pressure control.

Fail Safe Function:
If either of the shift solenoid valve circuits has an open or short failure, the TCM turns the other shift solenoid ”ON” and ”OFF” in order to shift into the gear positions shown in the table below.
In case of a short circuit, the TCM stops sending current to the short circuited solenoid.
Even if starting the engine again in the fail–safe mode, the gear position remains in the same position.

○: ON
X: OFF
→: Condition in the electrical malfunction is shown on the left of "→".
Condition in the fail–safe mode is shown on the right of "→".
(E/B): Engine brake.

Position	NORMAL						S1 OFF						S2 OFF						SR OFF					
	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2
"R"	R	○	×	×	×	○	R	×	×	×	×	○	R	○	×	×	×	○	R	○	×	×	×	○
"D"	1 st	○	×	×	×	○	4 th → 3 rd	×	× → ○	×	×	○	1 st	○	×	×	×	○	1 st	○	×	×	×	○
	2 nd	○	○	×	×	○	3 rd	×	○	×	×	○	1 st → 4 th	○ → ×	×	×	×	○	2 nd	○	○	×	×	○
	3 rd	×	○	×	×	○	3 rd	×	○	×	×	○	4 th	×	×	×	×	○	3 rd	×	○	×	×	○
	4 th	×	×	×	×	○	4 th	×	×	×	×	○	4 th	×	×	×	×	○	4 th	×	×	×	×	○
	5 th	×	×	○	○	×	5 th	×	×	○	○	×	5 th	×	×	○	○	×	4 th	×	×	×	○	×
"3"	1 st	○	×	×	×	○	3 rd → 3 rd E/B	×	× → ○	×	×	○ → ×	1 st	○	×	×	×	○	1 st	○	×	×	×	○
	2 nd	○	○	×	×	○	3 rd → 3 rd E/B	×	○	×	×	○ → ×	1 st → 3 rd E/B	○ → ×	×	×	×	○ → ×	2 nd	○	○	×	×	○
	3 rd E/B	×	○	×	×	×	3 rd E/B	×	○	×	×	×	3 rd E/B	×	×	×	×	×	3 rd E/B → 3 rd	×	○	×	×	× → ○
	4 th	×	×	○	×	○	4 th	×	×	○	×	○	4 th	×	×	○	×	○	3 rd	×	× → ○	×	×	○ → ○
	5 th	×	×	○	○	×	5 th	×	×	○	○	×	5 th	×	×	○	○	×	3 rd E/B → 3 rd	×	× → ○	×	○ → ×	× → ○
"2"	1 st	○	×	×	×	○	1 st	×	×	×	×	○	1 st	○	×	×	×	○	1 st	○	×	×	×	○
	2 nd E/B	○	○	○	×	×	3 rd E/B	×	○	○	×	×	2 nd E/B → 4 th	○ → ×	×	○	×	× → ○	2 nd	○	○	×	×	×
	3 rd E/B	×	○	○	×	×	3 rd E/B	×	○	○	×	×	Fail 4th	×	×	○	×	× → ○	2 nd	× → ○	○	×	×	×
	4 th	×	×	○	×	○	4 th	×	×	○	×	○	4 th	×	×	○	×	○	1 st → 2 nd	× → ○	× → ○	×	×	○ → ×
	5 th	×	×	○	○	×	5 th	×	×	○	○	×	5 th	×	×	○	○	×	1 st E/B → 2 nd	× → ○	○	×	○ → ×	×
"L"	1 st E/B	○	×	×	×	×	1 st E/B	×	×	×	×	×	1 st E/B	○	×	×	×	×	1 st E/B	○	×	×	×	×
	2 nd E/B	○	○	○	×	×	3 rd E/B	×	○	○	×	×	2 nd E/B → 4 th	○ → ×	×	○	×	× → ○	2 nd	○	○	×	×	×
	3 rd E/B	×	○	○	×	×	3 rd E/B	×	○	○	×	×	Fail 4 th	×	×	○	×	× → ○	2 nd	× → ○	○	×	×	×
	4 th	×	×	○	×	○	4 th	×	×	○	×	○	4 th	×	×	○	×	○	1 st → 2 nd	× → ○	× → ○	×	×	○ → ×
	5 th	×	×	○	○	×	5 th	×	×	○	○	×	5 th	×	×	○	○	×	1 st E/B → 2 nd	× → ○	× → ○	×	○ → ×	×

○: ON
X: OFF
→: Condition in the electrical malfunction is shown on the left of "→".
Condition in the fail–safe mode is shown on the right of "→".
(E/B): Engine brake.

Position	S1 S2 OFF						S2 SR OFF						S1 SR OFF						S1 S2 SR OFF					
	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2
"R"	R	X	X	X	X	○	R	○	X	X	X	○	R	X	X	X	X	○	R	X	X	X	X	○
"D"	4 th	X	X	X	X	○	1 st	○	X	X	X	○	4 th → 3 rd	X	X → ○	X	X	○	4 th	X	X	X	X	○
	4 th	X	X	X	X	○	1 st → 4 th	○ → X	X	X	X	○	3 rd	X	○	X	X	○	4 th	X	X	X	X	○
	4 th	X	X	X	X	○	4 th	X	X	X	X	○	3 rd	X	○	X	X	○	4 th	X	X	X	X	○
	4 th	X	X	X	X	○	4 th	X	X	X	X	○	4 th	X	X	X	X	○	4 th	X	X	X	X	○
	5 th	X	X	○	○	X	4 th	X	X	X	○ → X	X → ○	4 th	X	X	X	○ → X	X → ○	4 th	X	X	X	○ → X	X → ○
"3"	3 rd → 3 rd E/B	X	X	X	X	○ → X	1 st	○	X	X	X	○	3 rd	X	X → ○	X	X	○ → ○	3 rd	X	X	X	X	○ → ○
	3 rd → 3 rd E/B	X	X	X	X	○ → X	1 st → 3 rd	○ → X	X	X	X	○ → ○	3 rd	X	○	X	X	○ → ○	3 rd	X	X	X	X	○ → ○
	3 rd E/B	X	X	X	X	X	3 rd E/B → 3 rd	X	X	X	X	X → ○	3 rd E/B → 3 rd	X	○	X	X	X → ○	3 rd E/B → 3 rd	X	X	X	X	X → ○
	4 th	X	X	○	X	○	3 rd	X	X	X	X	○ → ○	3 rd	X	X → ○	X	X	○ → ○	3 rd	X	X	X	X	○ → ○
	5 th	X	X	○	○	X	1 st E/B → 3 rd	X	X	X	○ → X	X → ○	3 rd E/B → 3 rd	X	X → ○	X	○ → X	X → ○	3 rd E/B → 3 rd	X	X	X	○ → X	X → ○
"2"	1 st	X	X	X	X	○	1 st	○	X	X	X	○	1 st	X	X	X	X	○	1 st	X	X	X	X	○
	Fail 4 th	X	X	○	X	X → ○	1 st E/B → 1 st	○	X	X	X	X → ○	2 nd	X	○	X	X	X	1 st E/B → 1 st	X	X	X	X	X → ○
	Fail 4 th	X	X	○	X	X → ○	1 st E/B → 1 st	X → ○	X	X	X	X → ○	2 nd	X	○	X	X	X	1 st E/B → 1 st	X	X	X	X	X → ○
	4 th	X	X	○	X	○	1 st	X → ○	X	X	X	○	1 st → 2nd	X	X → ○	X	X	○ → X	1 st	X	X	X	X	○
	5 th	X	X	○	○	X	1 st E/B → 1 st	X → ○	X	X	○ → X	X → ○	1 st E/B → 2nd	X	X → ○	X	○ → X	X	1 st E/B → 1 st	X	X	X	○ → X	X → ○
"L"	1 st E/B	X	X	X	X	X	1 st E/B	○	X	X	X	X	1 st E/B	X	X	X	X	X	1 st E/B	X	X	X	X	X
	Fail 4 th	X	X	○	X	X → ○	1 st E/B → 1 st	○	X	X	X	X → ○	2 nd	X	○	X	X	X	1 st E/B → 1 st	X	X	X	X	X → ○
	Fail 4 th	X	X	○	X	X → ○	1 st E/B → 1 st	X → ○	X	X	X	X → ○	2 nd	X	○	X	X	X	1 st E/B → 1 st	X	X	X	X	X → ○
	4 th	X	X	○	X	○	1 st	X → ○	X	X	X	○	1 st → 2nd	X	X → ○	X	X	○ → X	1 st	X	X	X	X	○
	5 th	X	X	○	○	X	1 st E/B → 1 st	X → ○	X	X	○ → X	X → ○	1 st E/B → 2nd	X	X → ○	X	○ → X	X	1 st E/B → 1 st	X	X	X	○ → X	X → ○