DTC	P0488/15	EXHAUST GAS RECIRCULATION THROTTLE POSITION CONTROL RANGE/PERFORMANCE

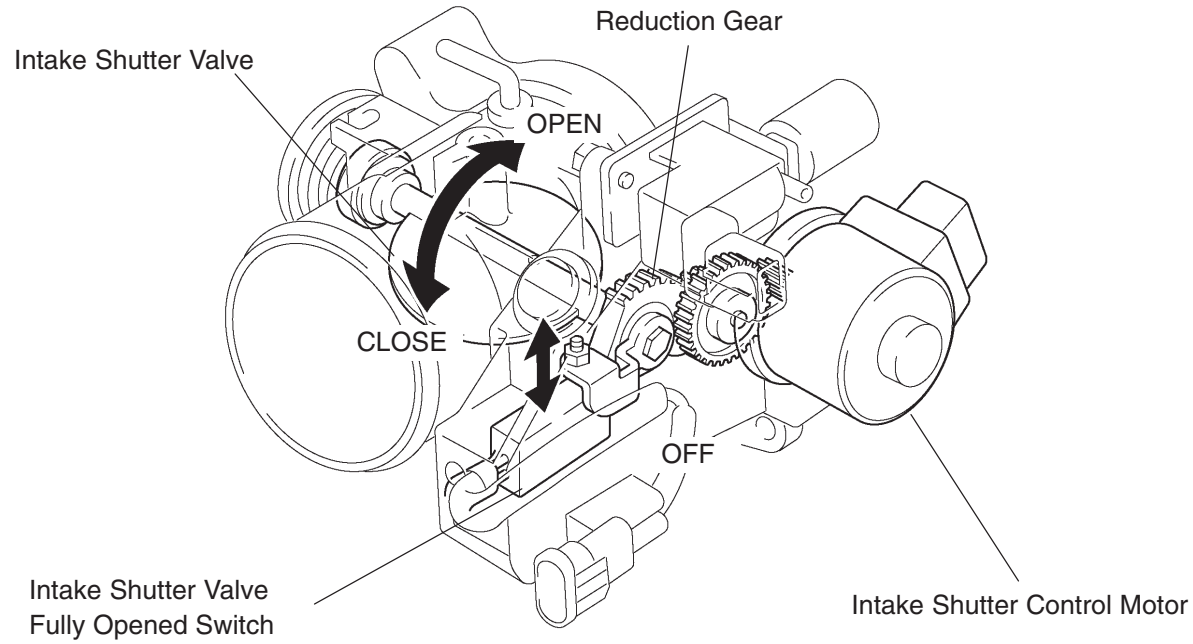
CIRCUIT DESCRIPTION

The ECM opens and closes the intake shutter (throttle valve) using the step motor. Upon opening and closing the valve, the exhaust gas recirculation volume is properly controlled. Also, engine vibrations and noises will be suppressed by closing the valve when the engine is stopped.

HINT:

The ECM detects fully open position of the intake shutter valve by using the intake shutter valve fully opened switch which is mounted on the intake shutter.

Intake Shutter Internal Structure:



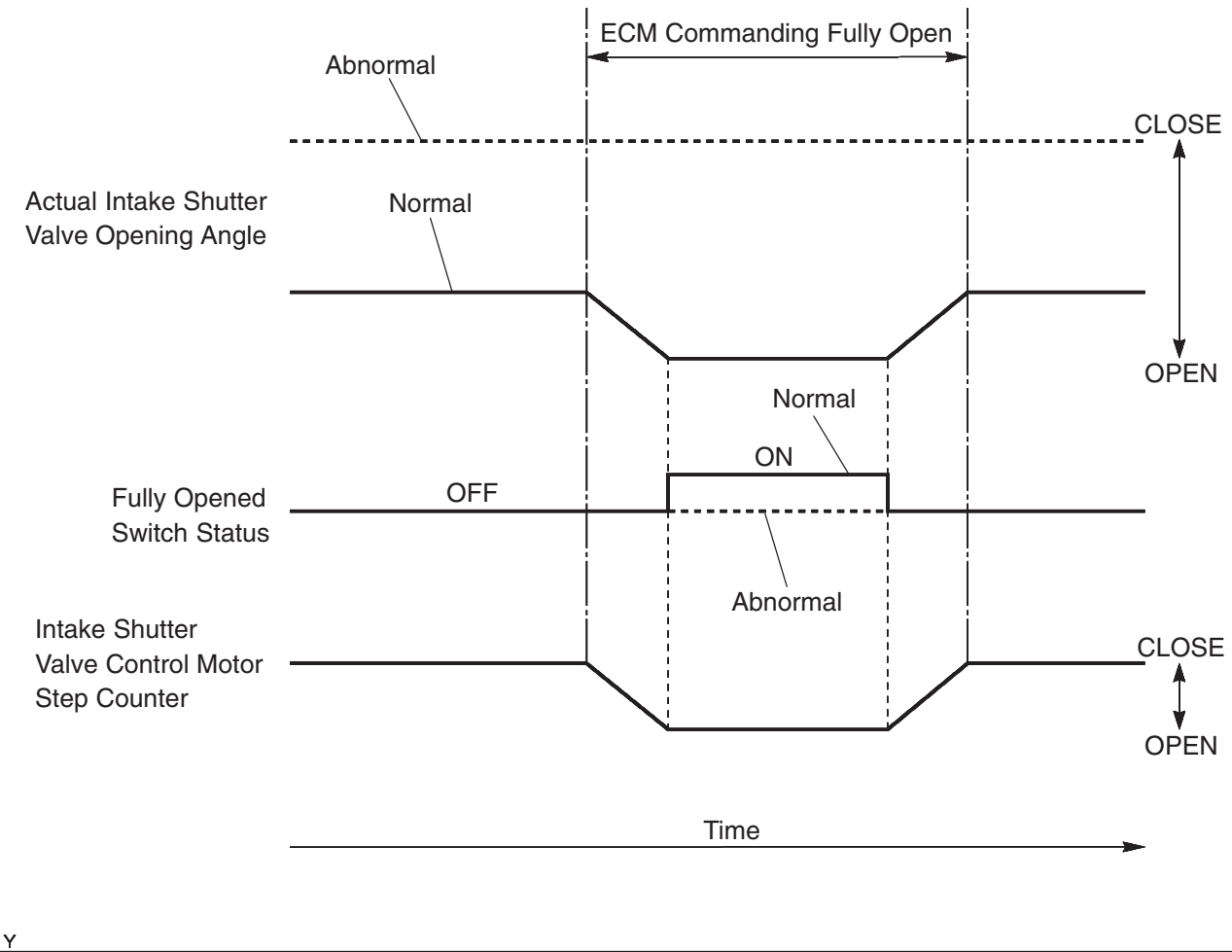
N G38713

DTC No.	DTC Detection Condition	Trouble Area
P0488	Intake shutter valve fully opened switch is not turned on, despite ECM commanding intake shutter valve to fully open (1 trip detection)	• Open or short in intake shutter control motor circuit • Open or short in intake shutter valve fully opened switch circuit • Intake shutter • ECM

MONITOR DESCRIPTION

This DTC will be set if the actual opening angle of the intake shutter valve varies from the target opening angle. The ECM forces the valve to fully open within 2 to 3 seconds after the engine switch is turned ON (IG), and then checks if the intake shutter valve fully opened switch is turned ON. In addition, the ECM also forces the valve to fully open when accelerating the engine (high engine load) and checks if the switch is turned ON. When starting and/or accelerating the engine, the ECM sets this DTC if the switch is not turned ON. If the DTC is set, the ECM enters fail–safe mode and limits the engine power. The fail–safe mode continues until the engine switch is turned OFF.

Malfunction Detection:



MONITOR STRATEGY

Required sensors	Intake shutter valve fully opened switch
Frequency of operation	Continuous
Duration	Throttle fully open switch ON is not detected more than the specified number of times.
MIL operation	1 driving cycle

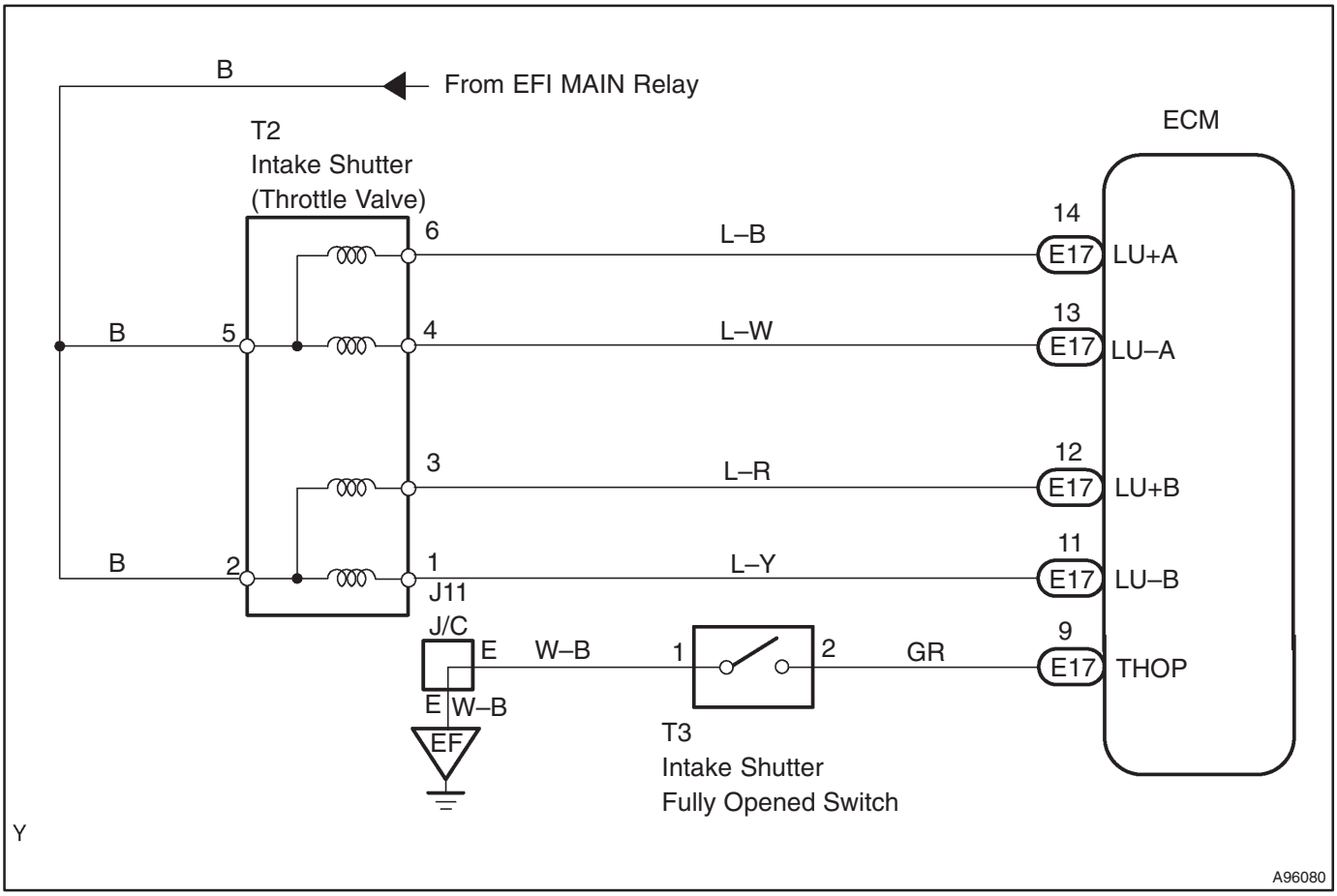
TYPICAL ENABLING CONDITIONS

Specification
Start the engine and let it idle for 30 seconds and accelerate the vehicle speed to 60 km/h (37 mph) with the accelerator pedal opened more than half angle

TYPICAL MALFUNCTION THRESHOLDS

Threshold
Intake shutter valve fully opened switch is not turned ON, despite the ECM commanding the intake shutter valve to open fully

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.

1	CHECK INTAKE SHUTTER ASSY

(a) Visually check that the intake shutter valve moves within approximately 2 to 3 seconds after the ignition switch is turned ON.

Result:

Intake Shutter Valve Condition	Proceed To
Does not move	A
Smoothly moves to full–open position	B

B → **Go to step 6**

A

2 CHECK INTAKE SHUTTER ASSY

(a) Check if the intake shutter valve moves as the lever is rotated by hand.
Result:

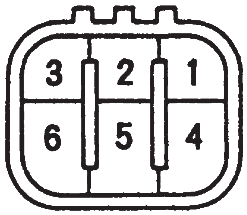
Intake Shutter Valve Condition	Proceed To
Smoothly moves	A
Difficult to move smoothly	B

B → **REPLACE INTAKE SHUTTER ASSY (SEE PAGE 10–20)**

A

3 INSPECT INTAKE SHUTTER ASSY

Component Side:



Intake Shutter Assy
A31135

(a) Disconnect the T2 intake shutter connector.
(b) Measure the resistance between the terminals.
Standard:

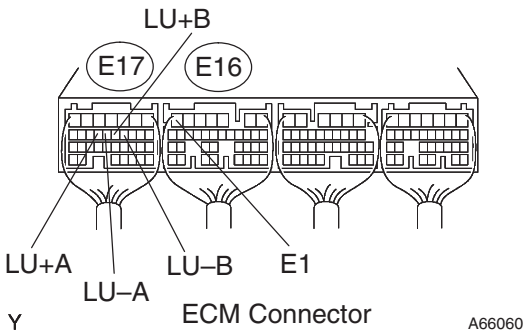
Tester Connection	Specified Condition
1 – 2	18 to 22 Ω at 20°C (68°F)
2 – 3	
4 – 5	
5 – 6	

(c) Reconnect the intake shutter connector.

NG → **REPLACE INTAKE SHUTTER ASSY (SEE PAGE 10–20)**

OK

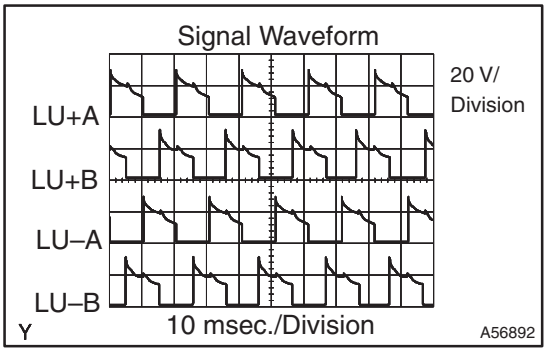
4 INSPECT ECM(LU VOLTAGE)



A66060

(a) Inspect the ECM using an oscilloscope.
(b) While repeating quick engine RPM accelerations, check the waveform between the specified terminals of the E16 and E17 ECM connector.
Standard:

Tester Connection	Specified Condition
LU+A (E17–14) – E1 (E16–7)	Correct waveform shown
LU–A (E17–13) – E1 (E16–7)	
LU+B (E17–12) – E1 (E16–7)	
LU–B (E17–11) – E1 (E16–7)	

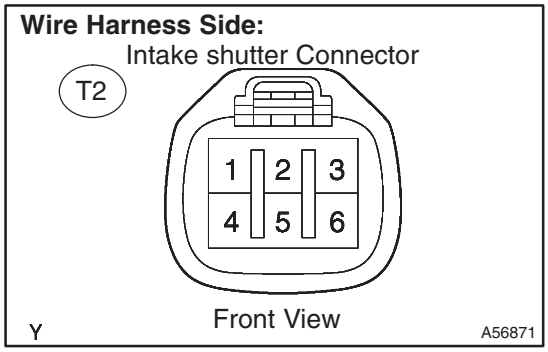


A56892

NG → Go to step 6

OK

5 CHECK HARNESS AND CONNECTOR(INTAKE SHUTTER ASSY – ECM)



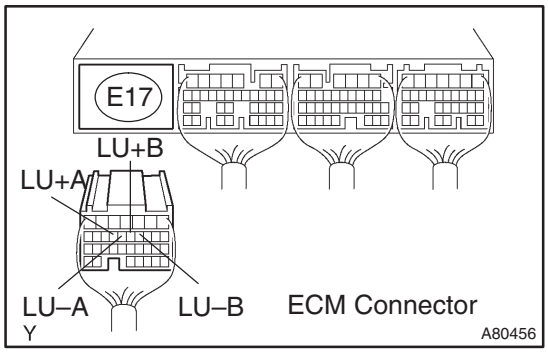
(a) Disconnect the T2 intake shutter connector.
(b) Disconnect the E17 ECM connector.
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
LU+A (E17–14) – Intake shutter (T2–6)	Below 1 Ω
LU–A (E17–13) – Intake shutter (T2–4)	
LU+B (E17–12) – Intake shutter (T2–3)	
LU–B (E17–11) – Intake shutter (T2–1)	

Standard (Check for short):

Tester Connection	Specified Condition
LU+A (E17–14) or Intake shutter (T2–6) – Body ground	10 kΩ or higher
LU–A (E17–13) or Intake shutter (T2–4) – Body ground	
LU+B (E17–12) or Intake shutter (T2–3) – Body ground	
LU–B (E17–11) or Intake shutter (T2–1) – Body ground	



(d) Reconnect the ECM connector.
(e) Reconnect the intake shutter connector.

OK → REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

6 READ VALUE USING INTELLIGENT TESTER II

(a) Connect an intelligent tester II to the DLC3.
(b) Turn the ignition switch ON and turn the intelligent tester II ON.
(c) Fully open the intake shutter valve by hand.
(d) On the intelligent tester II, select the following menu items: Powertrain / Engine and ECT / Data List / Throttle Open Switch.
(e) Read the value.

Result:

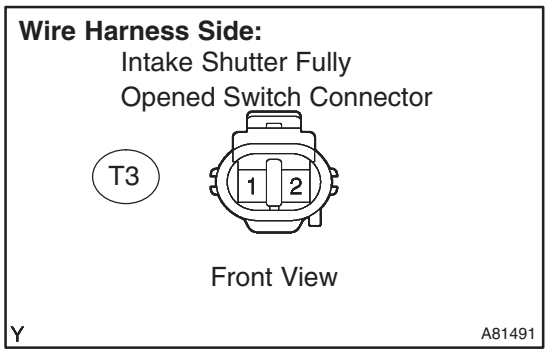
Switch Condition Display	Proceed To
OFF	A
ON	B

B → CHECK IF DTC OUTPUT RECURS

HINT:
After clearing the DTC, start the engine and let it idle for 30 seconds. Then, accelerate the vehicle to 60 km/h (37 mph) by depressing the accelerator pedal more than half angle. Confirm that P0488 is not present.

A

7 CHECK HARNESS AND CONNECTOR(FULLY OPENED SWITCH – ECM)



(a) Disconnect T3 the intake shutter fully opened switch connector.
(b) Disconnect the E17 ECM connector.
(c) Check the resistance.

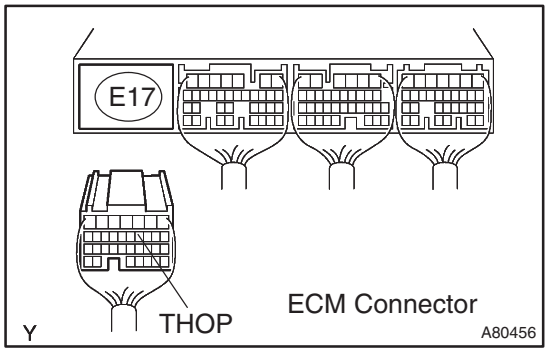
Standard (Check for open):

Tester Connection	Specified Condition
THOP (E17–9) – Intake shutter (T3–1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
THOP (E17–9) or Intake shutter (T3–1) – Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reconnect the intake shutter fully opened switch connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK IF DTC OUTPUT RECURS

HINT:
After clearing the DTC, start the engine and let it idle for 30 seconds. Then, accelerate the vehicle to 60 km/h (37 mph) by depressing the accelerator pedal more than half angle. Confirm that P0488 is not present.