DTC	P3190	POOR ENGINE POWER

DTC	P3191	ENGINE DOES NOT START

DTC	P3193	FUEL RUN OUT

CIRCUIT DESCRIPTION

From the HV ECU, the ECM receives data such as power output required for the engine (required output), estimated torque produced by the engine (estimated torque), engine RPM of control target (target RPM), whether the engine is in start mode or not. Then, based on the required output and target RPM, the ECM calculates a target torque that is to be produced by the engine and compares it with the estimated torque. If the estimated torque is very low compared with the target torque, or the engine start mode continues for the duration calvulated by water temperature, an abnormal condition is detected.

DTC No.	DTC Detecting Condition	Trouble Area
P3190	Following conditions continue at a fixed engine RPM or a fixed length of time: • Communication with HV ECU is normal • Engine RPM is a fixed value • Engine start mode is not active • Target torque is a fixed value • Ratio of estimated torque against target torque is less than 20%	• Air induction system • Throttle body • Fuel pressure • Engine • Mass Air flow meter • Out of fuel • Engine coolant temperature sensor • Crankshaft position sensor • Camshaft position sensor • ECM
P3191	Following conditions continue at a fixed engine RPM or a fixed length of time: • Communication with HV ECU is normal • Engine RPM is a fixed value • Engine start mode is active	• Air induction system • Throttle body • Fuel pressure • Engine • Mass Air flow meter • Out of fuel • Engine coolant temperature sensor • Crankshaft position sensor • Camshaft position sensor • ECM
P3193	Following conditions are met: • Fuel low level signal input into ECM • Detection condition for P3190 or P3191 is satisfied	• Out of fuel • ECM

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester II. Freeze frame data records the engine condition when malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P3190, P3191 AND/OR P3193)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the power switch ON (IG).
(c) Turn the intelligent tester II ON.
(d) On the intelligent tester II, select the item: Powertrain / Engine and ECT / DTC.
(e) Read DTCs.

Result:

Display (DTC output)	Proceed to
P3190, P3191 and/or P3193	A
P3190, P3191 and/or P3193, and other DTCs	B

HINT:
If any other codes besides P0300, P0301, P0302, P0303 or P0304 are output, perform troubleshooting for those DTCs first.

B → **GO TO RELEVANT DTC CHART** (See page 05–39)

A

2	CHECK SHORTAGE OF FUEL

(a) Check for fuel level.

OK: There is enough fuel to operate the engine in the tank.

HINT:
The fuel level check can be performed by intelligent tester. Refer to Data List / Fuel Level on page 05–31.

NG → **REFILL FUEL**

OK

3	CHECK AIR INDUCTION SYSTEM

OK: The air induction system has no leakage and blockages.

NG → **REPAIR OR REPLACE AIR INDUCTION SYSTEM**

OK

4	CHECK FOR UNUSUAL NOISE OR VIBRATION WHEN STARTING ENGINE OR RACING

OK: Unusual noise and vibration do not occur.

NG → **REPAIR OR REPLACE**

OK

5	CHECK FUEL PRESSURE (See page 18–3)

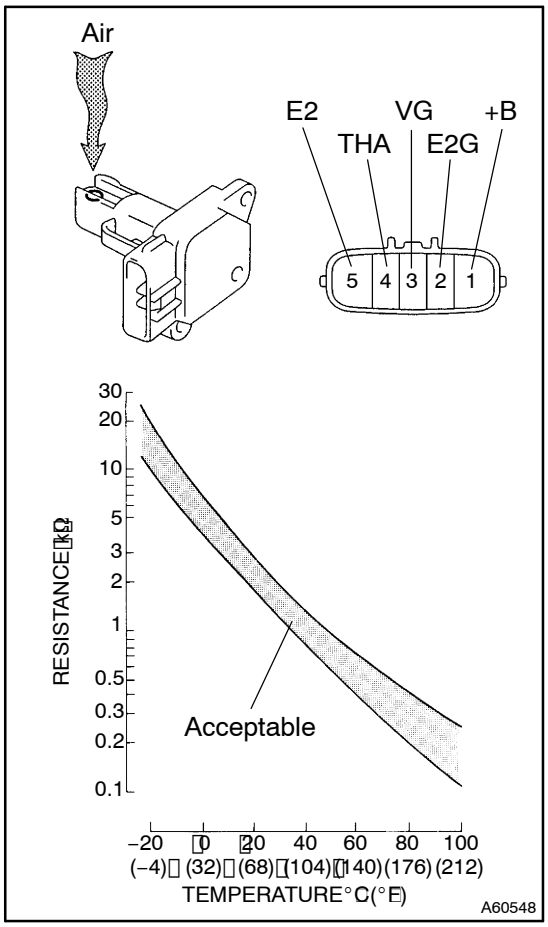
OK:

Fuel pressure: 304 to 343 kPa (3.1 to 3.5 kgf/cm^2, 44 to 50 psi)

NG → **CHECK AND REPAIR FUEL SYSTEM**

OK

6	INSPECT MASS AIR FLOW METER



(a) Remove the mass air flow meter.

(b) Inspect output voltage.

(1) Apply battery voltage across terminals +B and E2G.

(2) Connect the positive (+) tester prove to terminal VG, and negative (–) tester prove to terminal E2G.

(3) Blow air into the mass air flow meter, and check that the voltage fluctuates.

Standard:

Tester Connection	Specified Condition
VG (3) – E2G (2)	Sensor output voltage fluctuates between 0.3 V and 4.8 V

(c) Inspect resistance.

(1) Measure the resistance between terminals of the mass air flow meter.

Standard:

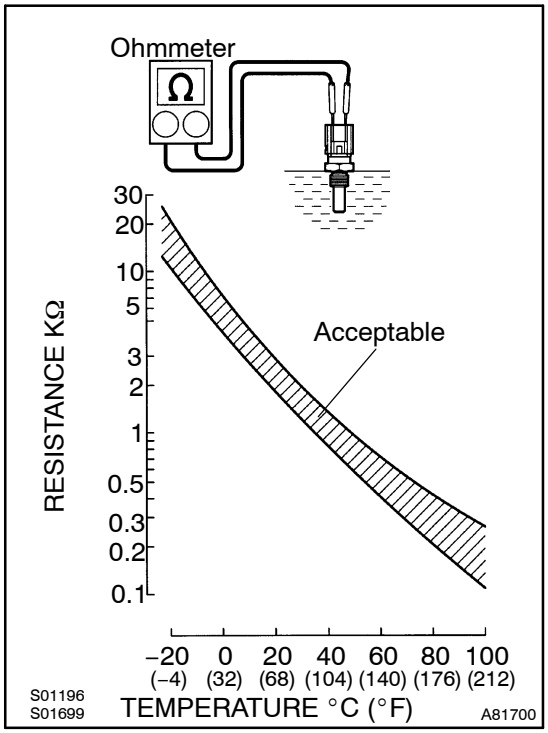
Tester Connection	Specified Condition
THA (4) – E2 (5)	13.6 to 18.4 kΩ at –20°C (–4°F)
THA (4) – E2 (5)	2.21 to 2.69 kΩ at 20°C (68°F)
THA (4) – E2 (5)	0.49 to 0.67 kΩ at 60°C (140°F)

(d) Reinstall the mass air flow meter.

NG → **REPLACE MASS AIR FLOW METER**

OK

7 INSPECT ENGINE COOLANT TEMPERATURE SENSOR



(a) Remove the engine coolant temperature sensor.
(b) Measure the resistance between the terminals of the engine coolant temperature sensor.
Standard:

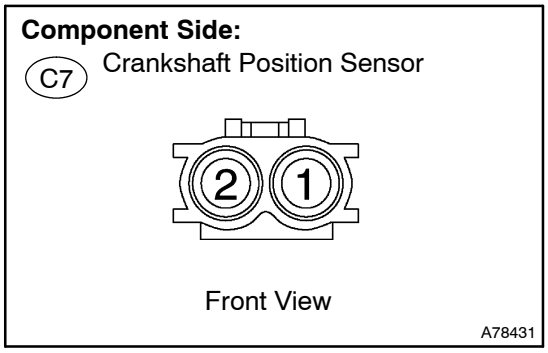
Tester Connection	Specified Condition
1 – 2	2 to 3 kΩ at 20°C (68°F)
1 – 2	0.2 to 0.4 kΩ at 80°C (176°F)

NOTICE:
In case of checking the engine coolant temperature sensor in water, be careful not to allow water to contact the terminals. After checking, dry the sensor.
HINT:
Alternate procedure: Connect an ohmmeter to the installed engine coolant temperature sensor and read the resistance. Use an infrared thermometer to measure the engine temperature in the immediate vicinity of the sensor. Compare these values to the resistance/temperature graph. Change the engine temperature (warm up or allow to cool down) and repeat the test.
(c) Reinstall the engine coolant temperature sensor.

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK

8 INSPECT CRANKSHAFT POSITION SENSOR



(a) Disconnect the C7 crankshaft position sensor connector.
(b) Measure the resistance between the terminals of the crankshaft position sensor connector.
Standard:

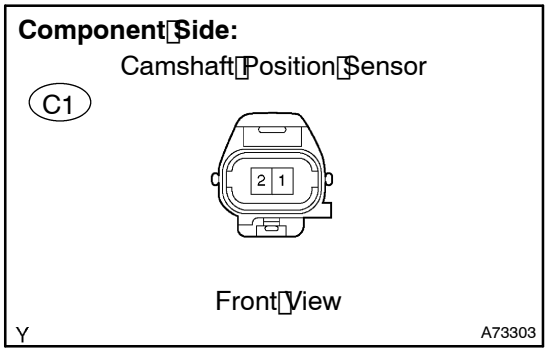
Tester Connection	Specified Condition
1 – 2	985 to 1,600 Ω at cold
1 – 2	1,265 to 1,890 Ω at hot

(c) Reconnect the crankshaft position sensor connector.
NOTICE:
Terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately –10°C to 50°C (14°F to 122°F). "Hot" means approximately 50°C to 100°C (122°F to 212°F).

NG → **REPLACE CRANKSHAFT POSITION SENSOR**

OK

9 INSPECT CAMSHAFT POSITION SENSOR



(a) Disconnect the C1 camshaft position sensor connector.
(b) Measure the resistance between the terminals of camshaft position sensor connector.

Standard:

Tester Connection	Specified Condition
1 – 2	1,630 to 2,740 Ω at cold
1 – 2	2,065 to 3,225 Ω at hot

(c) Reconnect the camshaft position sensor connector.

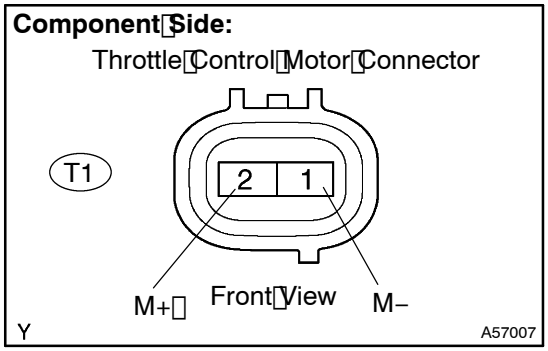
NOTICE:

Terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately –10°C to 50°C (14°F to 122°F). "Hot" means approximately 50°C to 100°C (122°F to 212°F).

NG → REPLACE CAMSHAFT POSITION SENSOR

OK

10 INSPECT THROTTLE CONTROL MOTOR



(a) Disconnect the throttle control motor connector.
(b) Using an ohmmeter, measure the motor resistance between terminals 1 (M–) and 2 (M+).

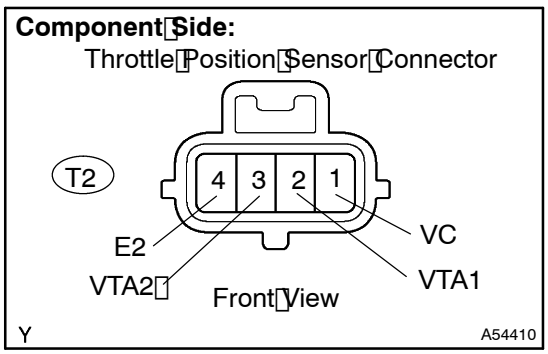
Standard:

Tester Connection	Specified Condition
1 – 2	0.3 to 100 Ω at 20°C (68°F)

NG → REPLACE THROTTLE CONTROL MOTOR

OK

11 INSPECT THROTTLE POSITION SENSOR



(a) Disconnect the throttle position sensor connector.
(b) Measure the resistance between the terminals of the throttle position sensor.

Standard:

Throttle position sensor terminal	Resistance
VC (1) – E2 (4)	1.2 to 3.2 kΩ at 20°C (68°F)
VTA1 (2) – E2 (4)	1.8 to 10.5 kΩ at 20°C (68°F)
VTA2 (3) – E2 (4)	1.8 to 10.5 kΩ at 20°C (68°F)

NG → REPLACE THROTTLE POSITION SENSOR

OK

REPLACE ECM (See page 10–24)