DIC2B–03

DTC	P0230/78	Fuel Pump Primary Circuit

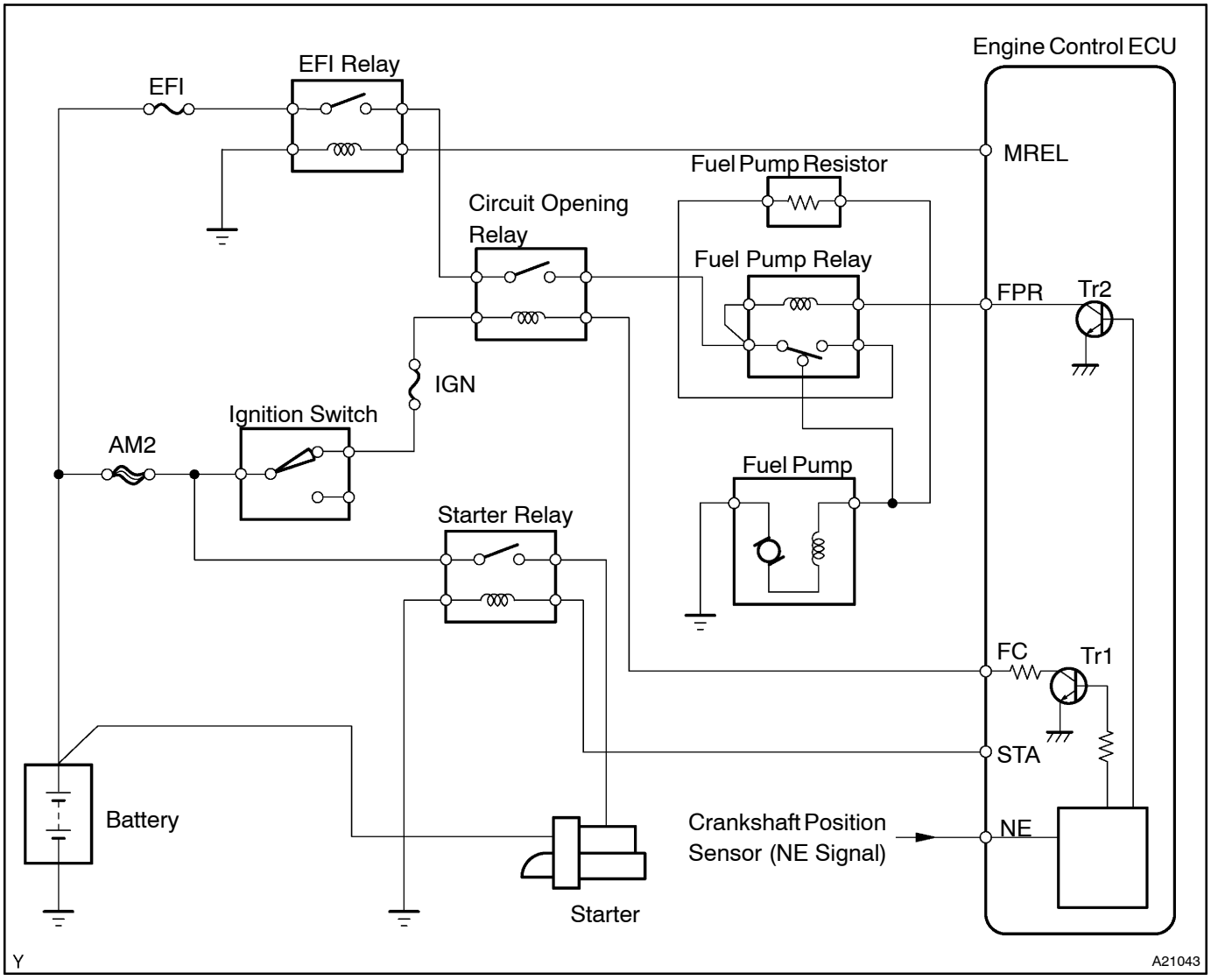
CIRCUIT DESCRIPTION

In the diagram below, when the engine is cranked, current flows from terminal STAR of the engine control ECU to the starter relay coil and also current flows to terminal STA of the engine control ECU (STA signal). When the STA signal and NE signal are input to the engine control ECU, the Tr1 is turned ON, current flows to the coil of the circuit opening relay, the relay switches on, power is supplied to the fuel pump, and the fuel pump operates.

While the NE signal is generated (engine running), the engine control ECU keeps the Tr1 ON (circuit opening relay ON) and the fuel pump also keeps operating.

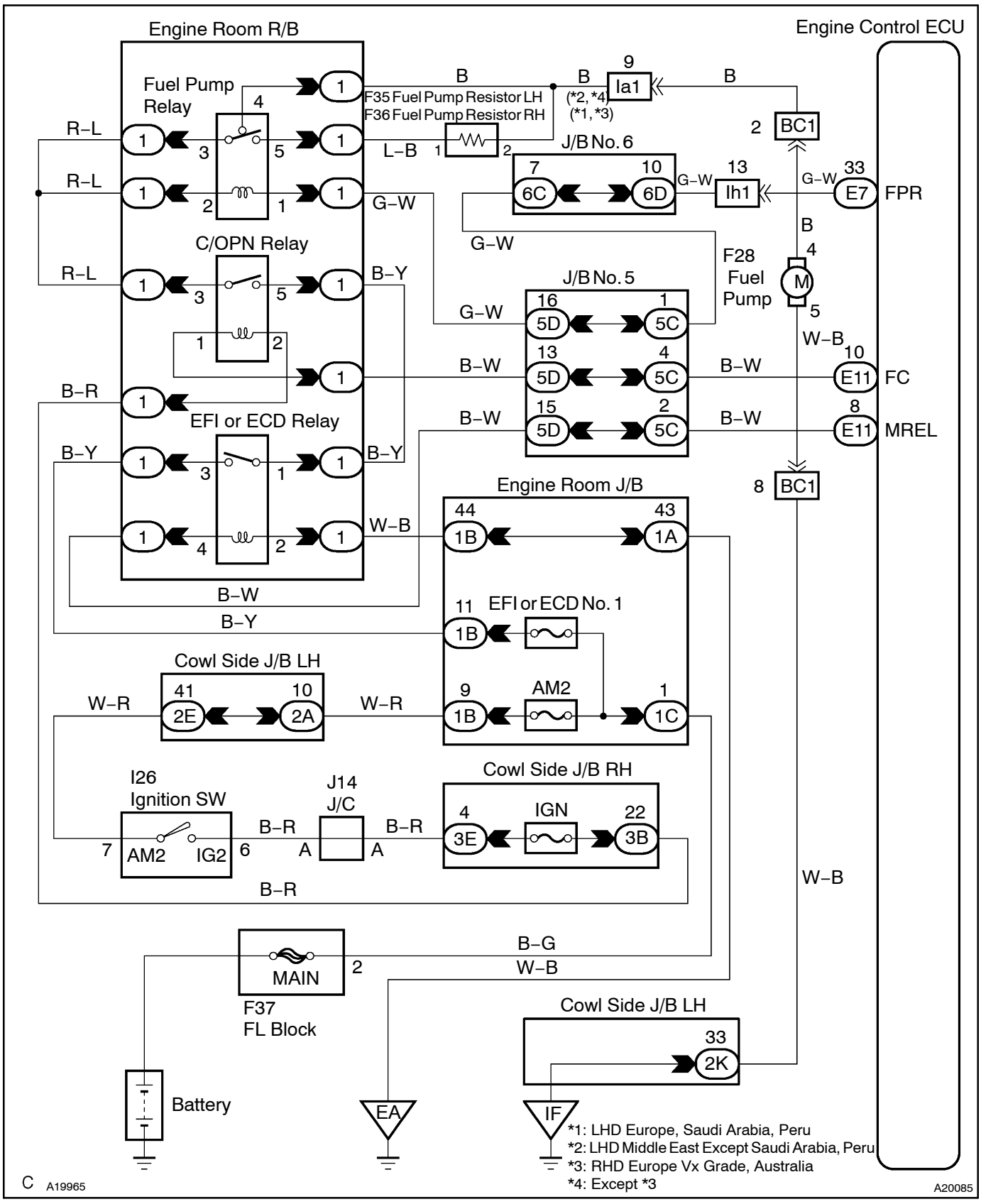
The fuel pump speed is controlled at two levels (high speed or low speed) by the condition of the engine (starting, light load, heavy load). When the engine starts (STA ON), the Tr2 in the engine control ECU is OFF, so the fuel pump relay closes and battery positive voltage is applied directly to the fuel pump. The fuel pump operates at high speed.

After the engine starts during idling or light loads, since the Tr2 goes ON, power is supplied to the fuel pump via the fuel pump resistor. The fuel pump operates at low speed.



DTC No.	DTC Detecting Condition	Trouble Area
P0230/78	Open or short in fuel pump relay circuit	• Open or short in fuel pump relay circuit • Fuel pump relay • Circuit opening relay • Fuel pump • Engine control ECU

WIRING DIAGRAM



HINT:

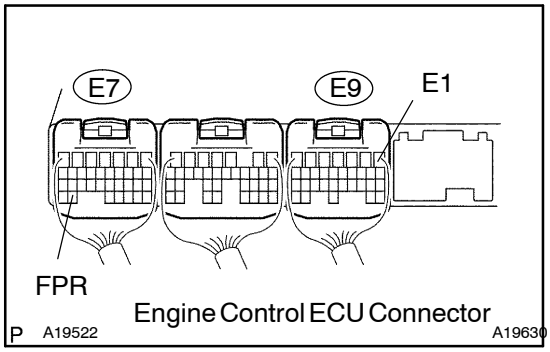
This diagnostic chart is based on premise that engine is started. If the engine is not started, proceed to problem symptoms table on DI–34.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand –held tester. Freeze frame data records the engine conditions when a 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, as well as other data from the time when a malfunction occurred.

1	**Check voltage between terminal FPR and E 1 of engine control ECU.**



CHECK:

Measure the voltage between terminals of E7 and E9 engine control ECU connectors.

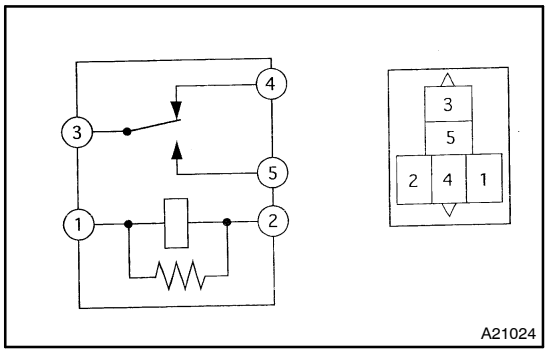
OK:

Tester Connection	Condition	Specified Condition
FPR (E7 –33) – E1 (E9 –1)	STA signal ON	9 to 14 V
FPR (E7 –33) – E1 (E9 –1)	STA signal OFF	0 to 3 V

OK → **Replace engine control ECU (See Pub. No. RM630E, page FI –74).**

NG

2	**Check fuel pump relay.**



PREPARATION:

Remove the fuel pump relay from the engine room R/B.

CHECK:

Inspect the fuel pump relay.

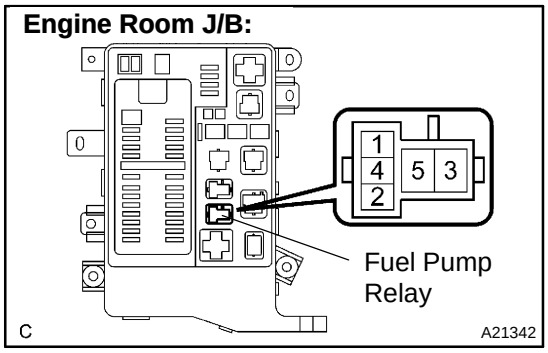
OK:

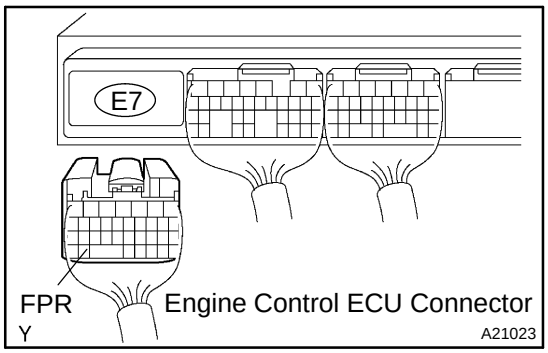
Tester Connection	Specified Condition
3 – 4	Below 1 Ω
3 – 5	10 k Ω or higher
3 – 5	Below 1 Ω (Apply battery voltage terminal 1 and 2)

NG → **Replace fuel pump relay.**

OK

3	**Check for open and short in harness and connector between fuel pump relay and engine control ECU.**





PREPARATION:

(a) Remove the fuel pump relay from the engine room J/B.
(b) Disconnect the E7 engine control ECU connector.

CHECK:

Measure the resistance between wire harness side connectors.

OK:

Tester Connection	Specified Condition
Engine Room J/B (Fuel pump relay terminal 1) − FPR (E7−33)	Below 1 Ω
Engine Room J/B (Fuel pump relay terminal 1) or FPR (E7−33) − Body ground	10 kΩ or higher

NG → **Repair or replace harness or connector.**

OK

Replace engine control ECU (See Pub. No. RM630, page FI−74).