DTC	97	EDU CIRCUIT MALFUNCTION

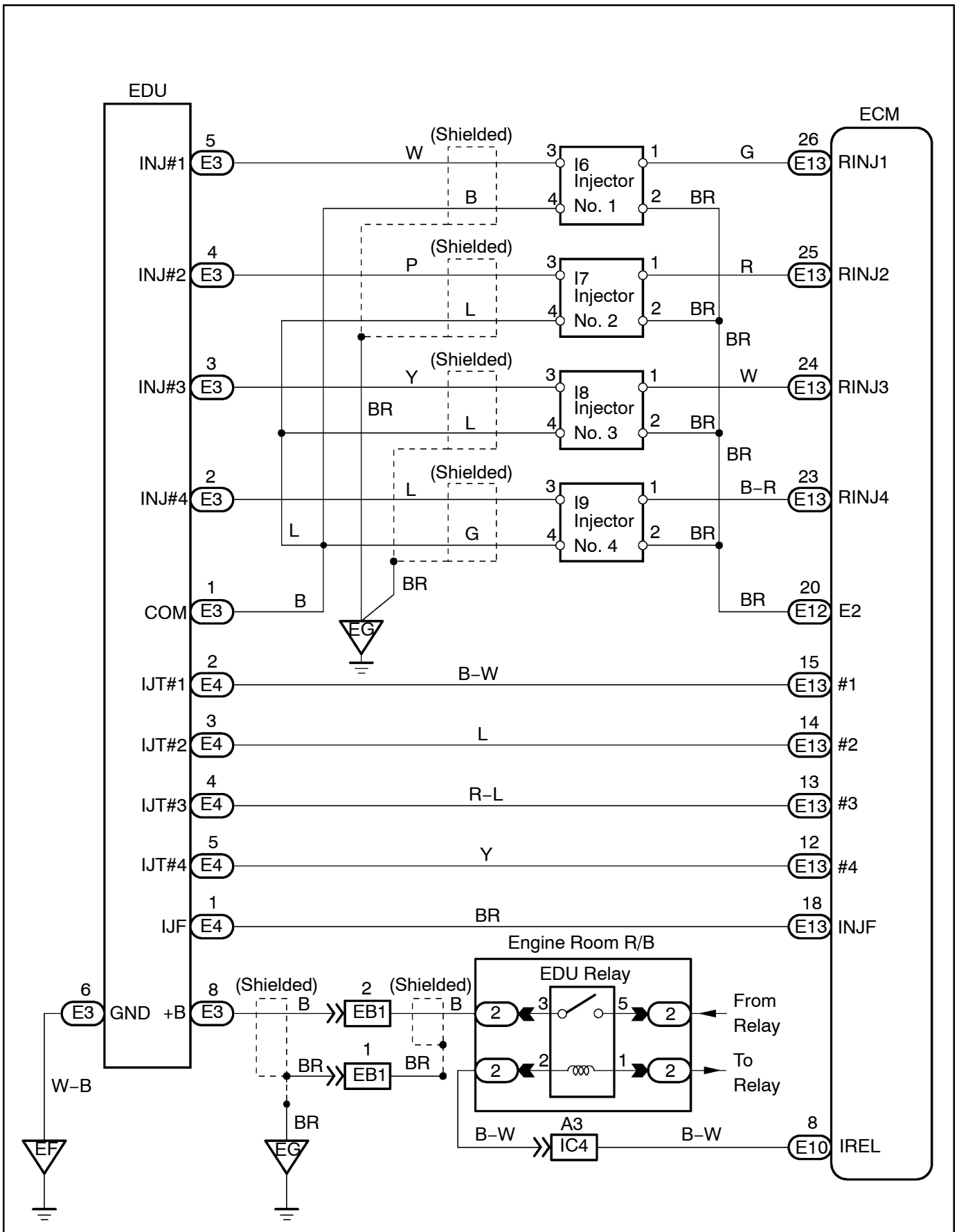
CIRCUIT DESCRIPTION

The ECM has been adopted to drive the injector at high speeds. The EDU has realized high–speed driving under high fuel pressure conditions through the use of a DC/DC converter that provides a high–voltage, quick–charging system.

The ECM constantly monitors the EDU and stops the engine in case an abnormal condition is detected.

DTC No.	DTC Detection condition	Trouble Area
97	Open or short in EDU circuit	• Open or short in EDU circuit • EDU • Open or short in SCV circuit • SCV • Injector • ECM

WIRING DIAGRAM

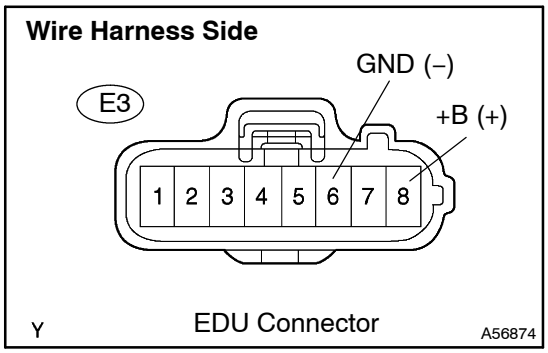


INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand–held tester, as freeze frame records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, etc. at the time of the malfunction.

1 CHECK HARNESS AND CONNECTOR(EDU POWER SOURCE)



(a) Disconnect the EDU E3 connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage between the terminals of the EDU connector.

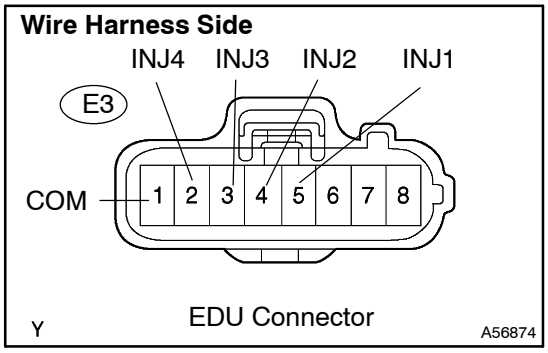
Voltage:

Symbols (Terminal No.)	Specified condition
+B (E3 – 8) ⇔ GND (E3 – 6)	9 – 14 V

NG → **CHECK EDU POWER SOURCE CIRCUIT**

OK

2 CHECK HARNESS AND CONNECTOR(FOR EDU CONNECTOR)



(a) Disconnect the EDU E3 connector.
(b) Turn the ignition switch ON.
(c) Check the resistance between the terminals of the EDU connector.

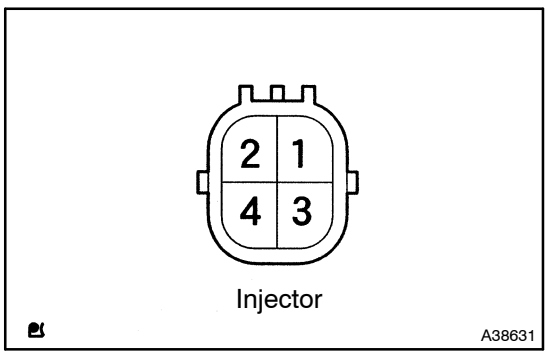
Resistance:

Symbols (Terminal No.)	Specified condition
COM (E3 – 1) ⇔ INJ4 (E3 – 2)	2.5 – 3.1 Ω at 20 °C (68 °F)
COM (E3 – 1) ⇔ INJ3 (E3 – 3)	
COM (E3 – 1) ⇔ INJ2 (E3 – 4)	
COM (E3 – 1) ⇔ INJ1 (E3 – 5)	

OK → **Go to step 4**

NG

3 INSPECT INJECTOR ASSY



(a) Check the injector for resistance.
(1) Using an ohmmeter, measure the resistance between the terminals of the injector connector.

Resistance:

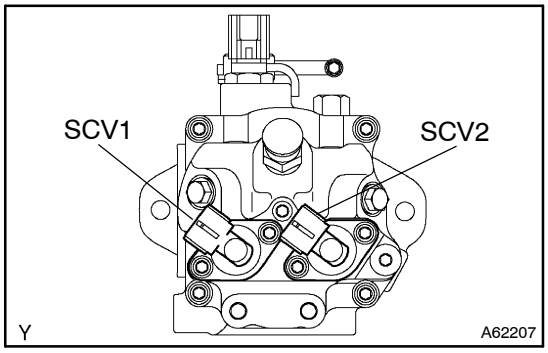
Terminal No.	Specified condition
3 ⇔ 4	2.6 – 2.8 Ω at 20 °C (68 °F)

NG → REPLACE INJECTOR ASSY (See page 11–106)

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

4 INSPECT INJECTION OR SUPPLY PUMP ASSY(CHECK SCV1 AND SCV2)

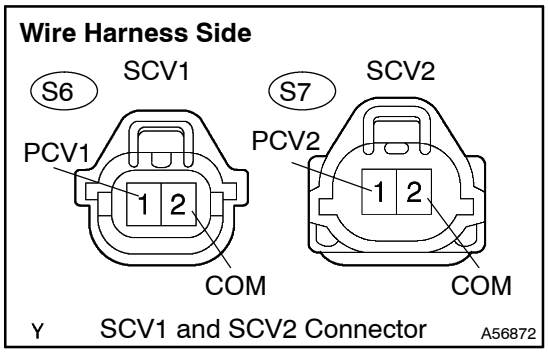


(a) Check the injection or supry pump assy for resistance (SCV1).
  (1) Using an ohmmeter, measure the resistance between terminals.
  Resistance: 1.5 – 1.7 Ω at 20°C (68°F)
(b) Check the injection or supry pump assy for resistance (SCV2).
  (1) Using an ohmmeter, measure the resistance between terminals.
  Resistance: 1.5 – 1.7 Ω at 20°C (68°F)

NG → REPLACE INJECTION OR SUPPLY PUMP ASSY(See page 11–117)

OK

5 CHECK HARNESS AND CONNECTOR(SCV1 AND SCV2 – ECM)



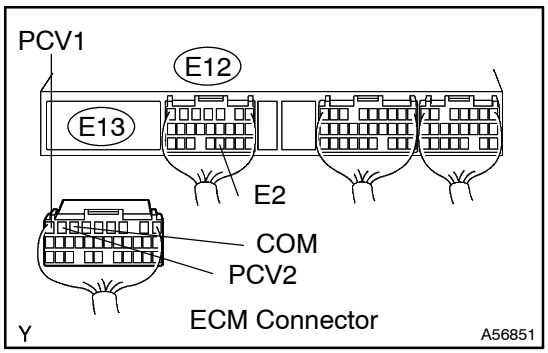
(a) Disconnect the SCV1 and SCV2 connector.
(b) Disconnect the ECM E13 connector.
(c) Check the continuity between the wire harness side connector.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
PCV1 (S6 – 1) ⇔ PCV1 (E13 – 9)	Continuity
PCV2 (S7 – 1) ⇔ PCV2 (E13 – 8)	
COM (S6 – 2) ⇔ COM (E13 – 7)	
COM (S7 – 2) ⇔ COM (E13 – 7)	

Standard (Check for short):

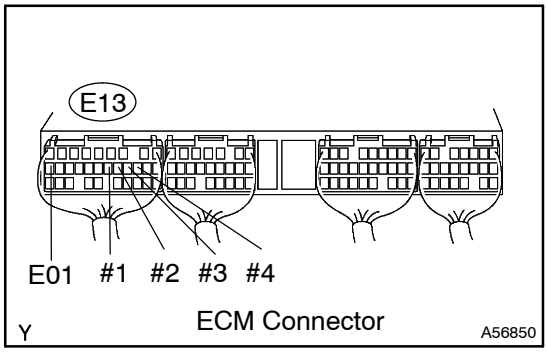
Symbols (Terminal No.)	Specified condition
PCV1 (E13 – 9) ⇔ COM (E13 – 7)	No continuity
PCV2 (E13 – 8) ⇔ COM (E13 – 7)	
PCV1 (E13 – 9) ⇔ E2 (E12 – 20)	
PCV2 (E13 – 8) ⇔ E2 (E12 – 20)	
COM (E13 – 7) ⇔ E2 (E12 – 20)	



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

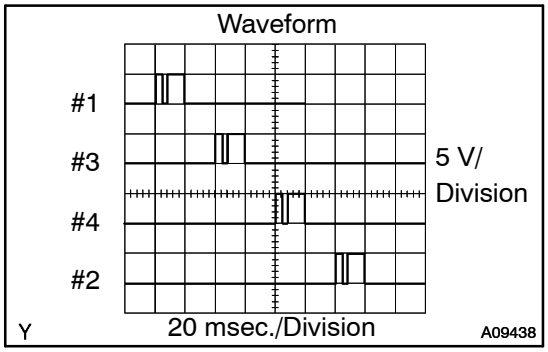
6 INSPECT ECM



(a) Start the engine.
(b) Check the output waveform.

Item	Contents
Terminal	#1 – #4 ⇔ E01
Equipment Set	5V/DIV, 20ms/DIV
Condition	During Cranking or idling

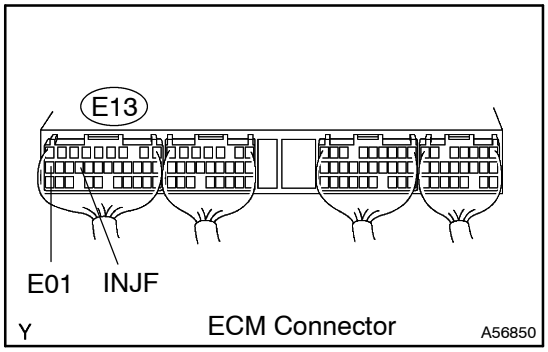
HINT:
The correct waveforms are as shown.



NG → CHECK AND REPLACE ECM

OK

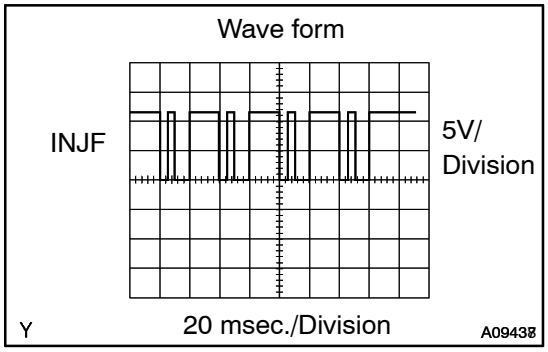
7 INSPECT ECM



(a) Start the engine.
(b) Check the output waveform.

Item	Contents
Terminal	INJF ⇔ E01
Equipment Set	5V/DIV, 20ms/DIV
Condition	During Cranking or idling

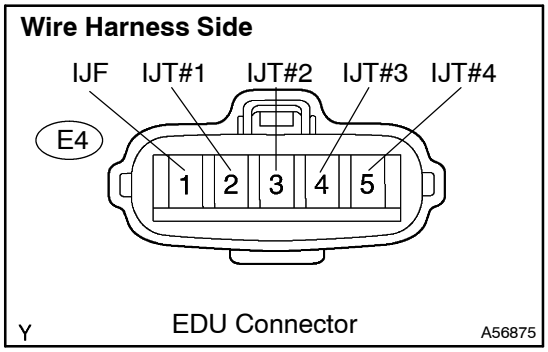
HINT:
The correct waveforms are as shown.

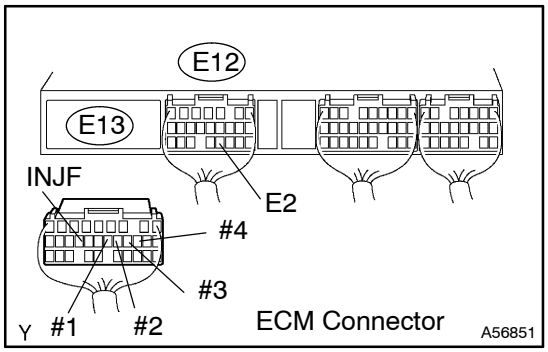


NG → CHECK AND REPLACE ECM

OK

8 CHECK HARNESS AND CONNECTOR(EDU – ECM)





(a) Disconnect the EDU E4 connector.
(b) Disconnect the ECU E13 connector.
(c) Check the continuity between the terminals of the wire harness side connector.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
IJT#1 (E4 – 2) ⇔ #1 (E13 – 15)	Continuity
IJT#2 (E4 – 3) ⇔ #2 (E13 – 14)	
IJT#3 (E4 – 4) ⇔ #3 (E13 – 13)	
IJT#4 (E4 – 5) ⇔ #4 (E13 – 12)	
IJF (E4 – 1) ⇔ INJF (E13 – 18)	

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
#1 (E13 – 15) ⇔ INJF (E13 – 18) and E2 (E12 – 20)	No continuity
#2 (E13 – 14) ⇔ INJF (E13 – 18) and E2 (E12 – 20)	
#3 (E13 – 13) ⇔ INJF (E13 – 18) and E2 (E12 – 20)	
#4 (E13 – 12) ⇔ INJF (E13 – 18) and E2 (E12 – 20)	
INJF (E13 – 18) ⇔ E2 (E12 – 20)	

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

OK

REPLACE INJECTOR DRIVER