DTC	78(2)	FUEL PUMP SYSTEM MALFUNCTION (SHORT)

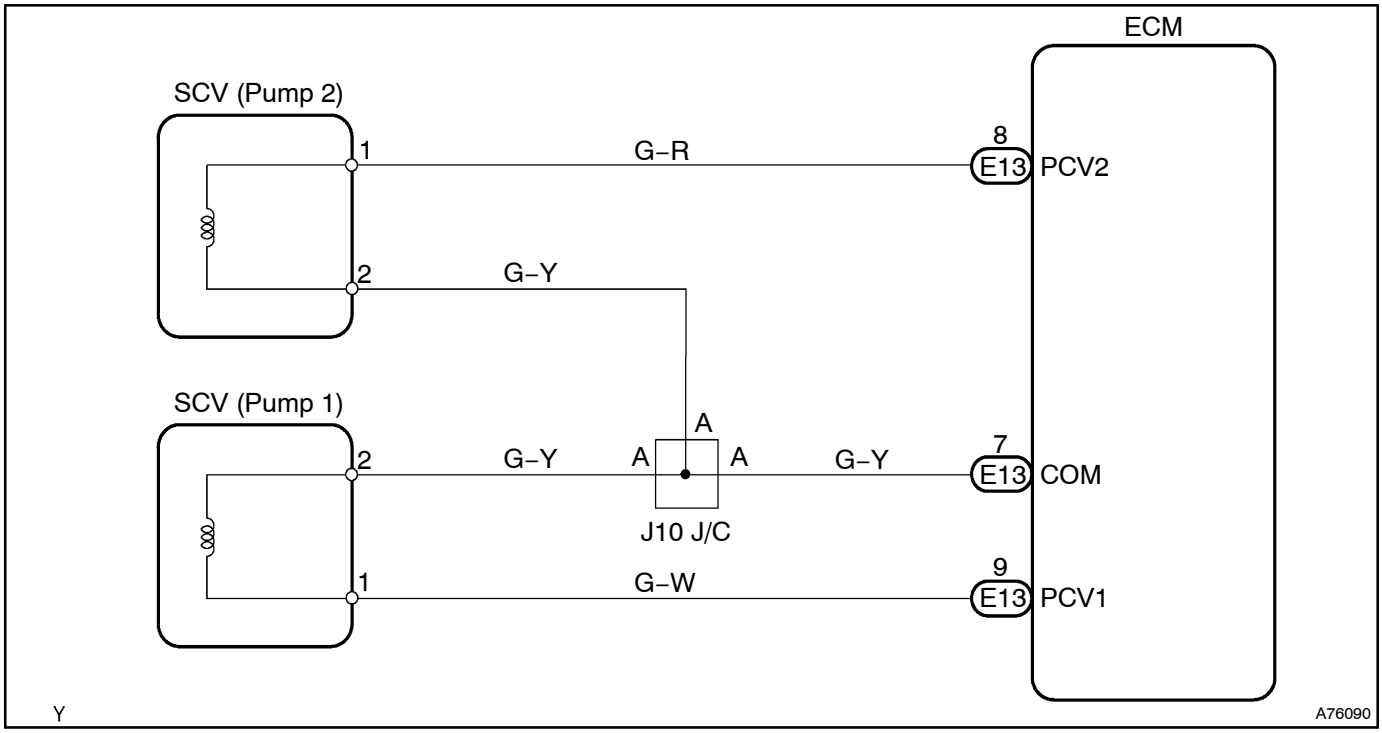
DTC	78(3)	FUEL PUMP SYSTEM MALFUNCTION (OVER PRESSURE)

CIRCUIT DESCRIPTION

Supply pump is a tandem type and has two circuits of the fuel suction and force feed processes that achieve both high pressure force feed of fuel and reduction of driving torque.
In the suction process, it control SCV (Suction Control Valve) which suctions fuel by a plunger.

DTC No.	DTC Detection condition	Trouble Area
78 (2) 78 (3)	Pressure change of common rail against supply quantify of supply pump is abnormal	• Open or short in SCV circuit • SCV • Supply pump • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the hand–held tester, as freeze frame data 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.

When using hand–held tester:

1	READ OUTPUT DTC

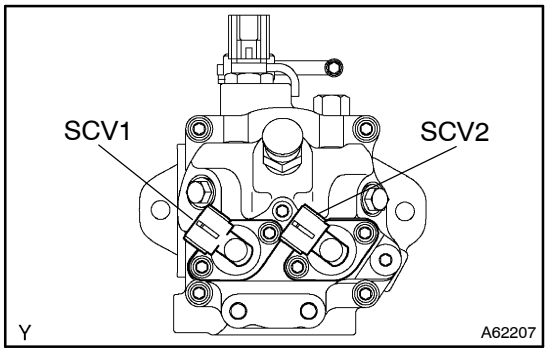
Result:

Display (DTC output)	Proceed
39, 49 or 97 are not output	A
39, 49 or 97 are output	B

B → **GO TO RELEVANT DTC CHART (See page 05–437)**

A

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



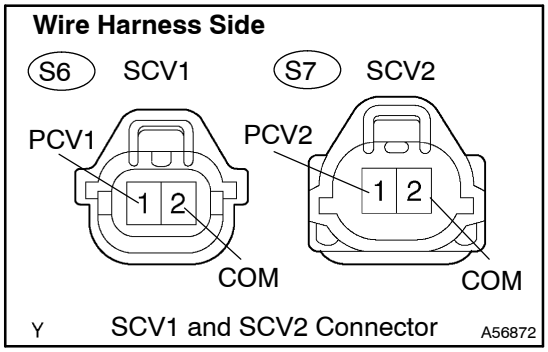
(a) Check the injection or supry pump assy for resistance (SCV1).
  (1) Using an ohmmeter, measure the resistance between terminals.
  Resistance: 1.5 – 1.7 Ω at 20°C (68°F)

(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

3 CHECK HARNESS AND CONNECTOR(SCV – ECM)



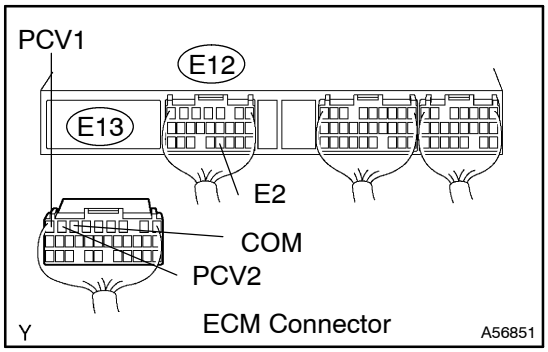
(a) Disconnect the SCV1 and SCV2 connector.
(b) Disconnect the ECM E13 connector.
(c) Check the continuity between the wire harness side connector.

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):

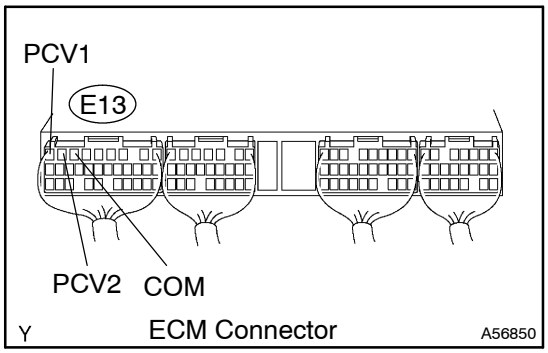
Symbols (Terminal No.)	Specified condition
PCV1 (E13 – 9) ⇔ COM (E13 – 7)	No continuity
PCV2 (E13 – 8) ⇔ COM (E13 – 7)	
PCV1 (E13 – 9) ⇔ E2 (E12 – 20)	
PCV2 (E13 – 8) ⇔ E2 (E12 – 20)	
COM (E13 – 7) ⇔ E2 (E12 – 20)	



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

OK

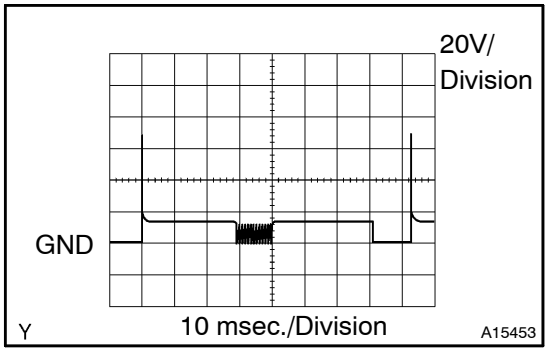
4 INSPECT ECM



(a) Check the output waveform.

Item	Contents
Terminal	CH1: PCV1 ⇔ COM CH2: PCV2 ⇔ COM
Equipment Set	20V/DIV, 10ms/DIV
Condition	During Cranking or idling

HINT:
The correct waveforms are as shown.



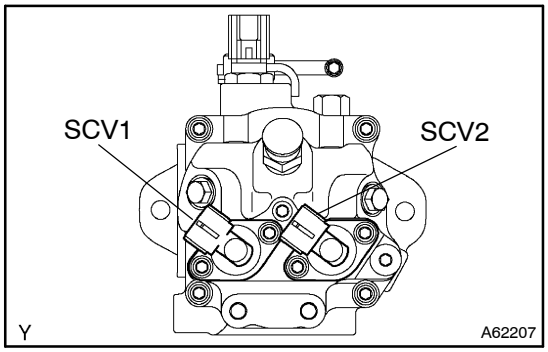
NG → CHECK AND REPLACE ECM

OK

REPLACE INJECTION OR SUPPLY PUMP ASSY

When not using hand–held tester:

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



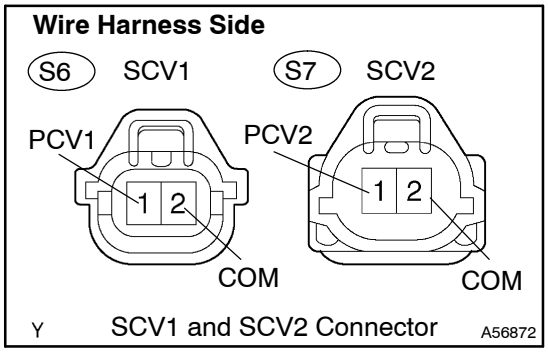
(a) Check the injection or supry pump assy for resistance (SCV1).
  (1) Using an ohmmeter, measure the resistance between terminals.
  Resistance: 1.5 – 1.7 Ω at 20°C (68°F)

(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

2 CHECK HARNESS AND CONNECTOR(SCV – ECM)



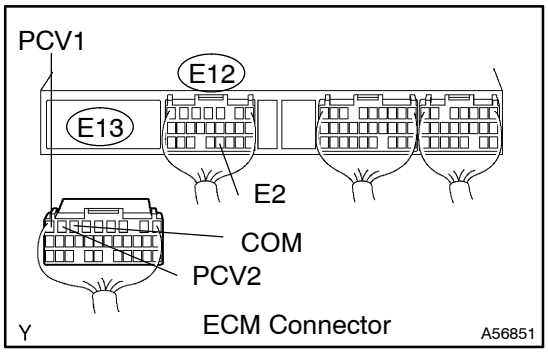
(a) Disconnect the SCV1 and SCV2 connector.
(b) Disconnect the ECM E13 connector.
(c) Check the continuity between the wire harness side connector.

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):

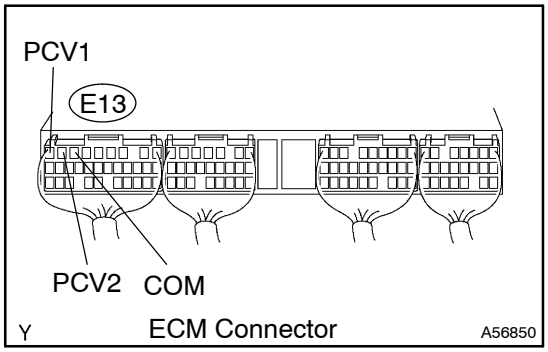
Symbols (Terminal No.)	Specified condition
PCV1 (E13 – 9) ⇔ COM (E13 – 7)	No continuity
PCV2 (E13 – 8) ⇔ COM (E13 – 7)	
PCV1 (E13 – 9) ⇔ E2 (E12 – 20)	
PCV2 (E13 – 8) ⇔ E2 (E12 – 20)	
COM (E13 – 7) ⇔ E2 (E12 – 20)	



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

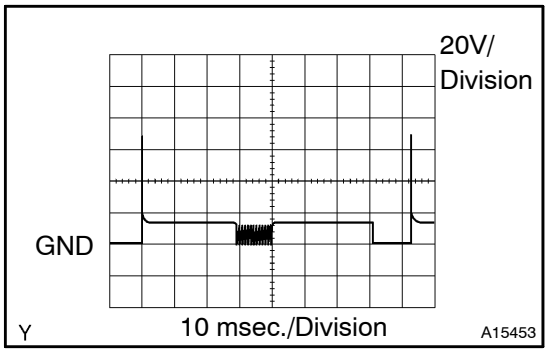
3 INSPECT ECM



(a) Check the output waveform.

Item	Contents
Terminal	CH1: PCV1 ⇔ COM CH2: PCV2 ⇔ COM
Equipment Set	20V/DIV, 10ms/DIV
Condition	During Cranking or idling

HINT:
The correct waveforms are as shown.



NG → **CHECK AND REPLACE ECM**

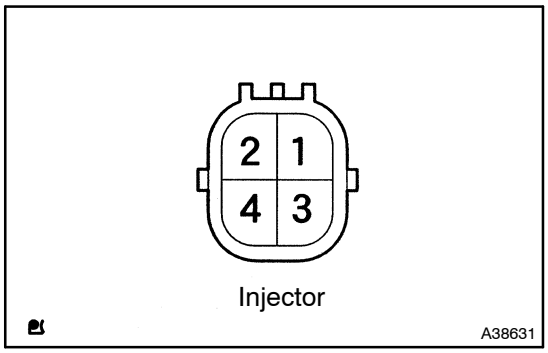
OK

4 CHECK ENGINE START

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

NO

5 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

REPLACE COMMON RAIL ASSY (See page 11–122)