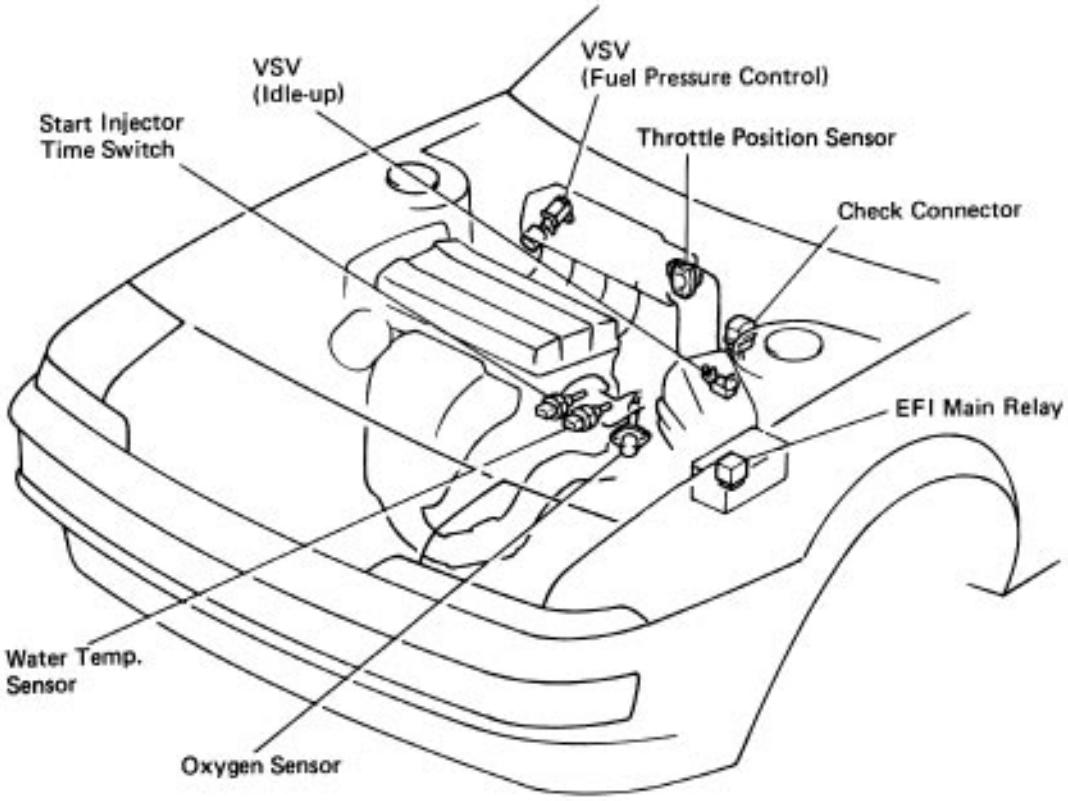
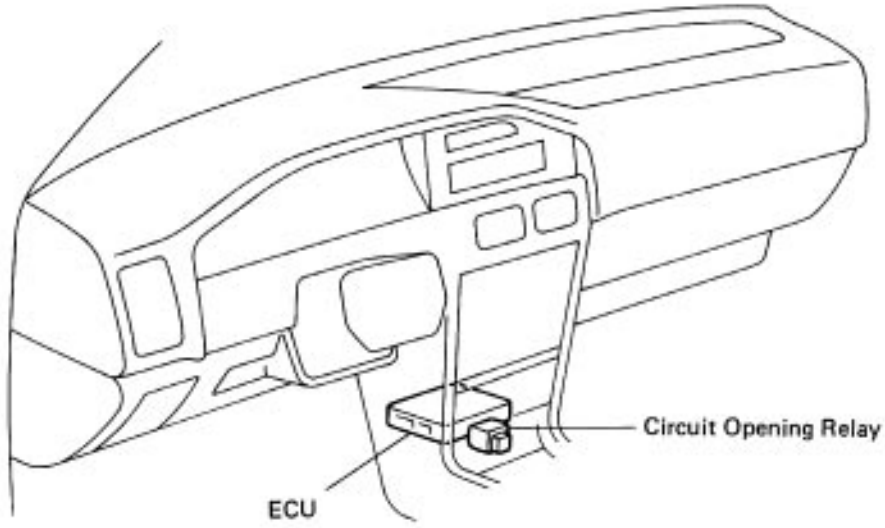
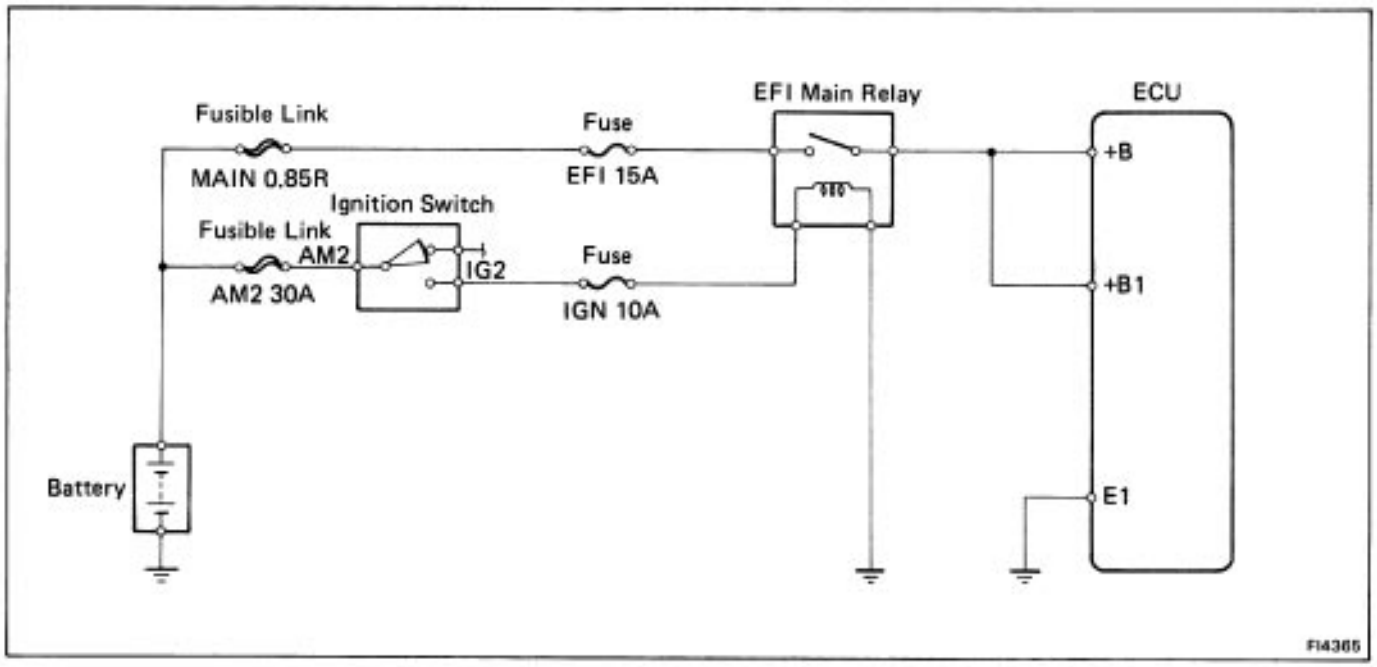
ELECTRONIC CONTROL SYSTEM
Location of Electronic Control Parts

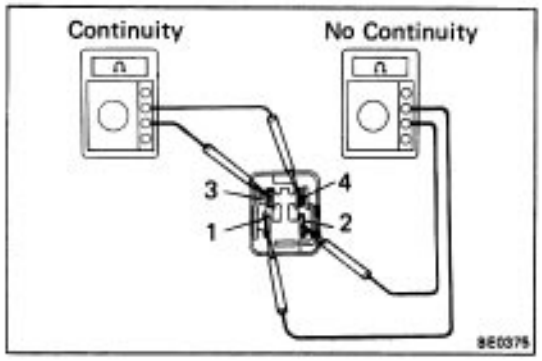




FI2808
FI4690

EFI Main Relay





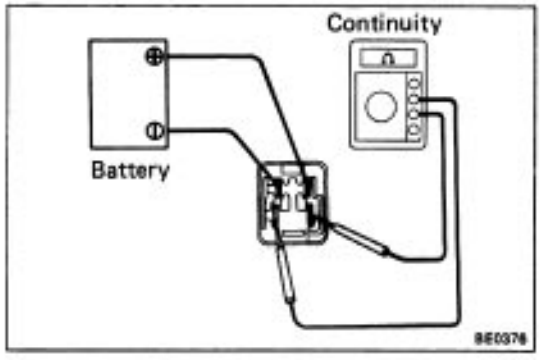
INSPECTION OF EFI MAIN RELAY

1. INSPECT RELAY CONTINUITY

(a) Check that there is continuity between terminals 3 and 4.

(b) Check that there is no continuity between terminals 1 and 2.

If continuity is not as specified, replace the relay.



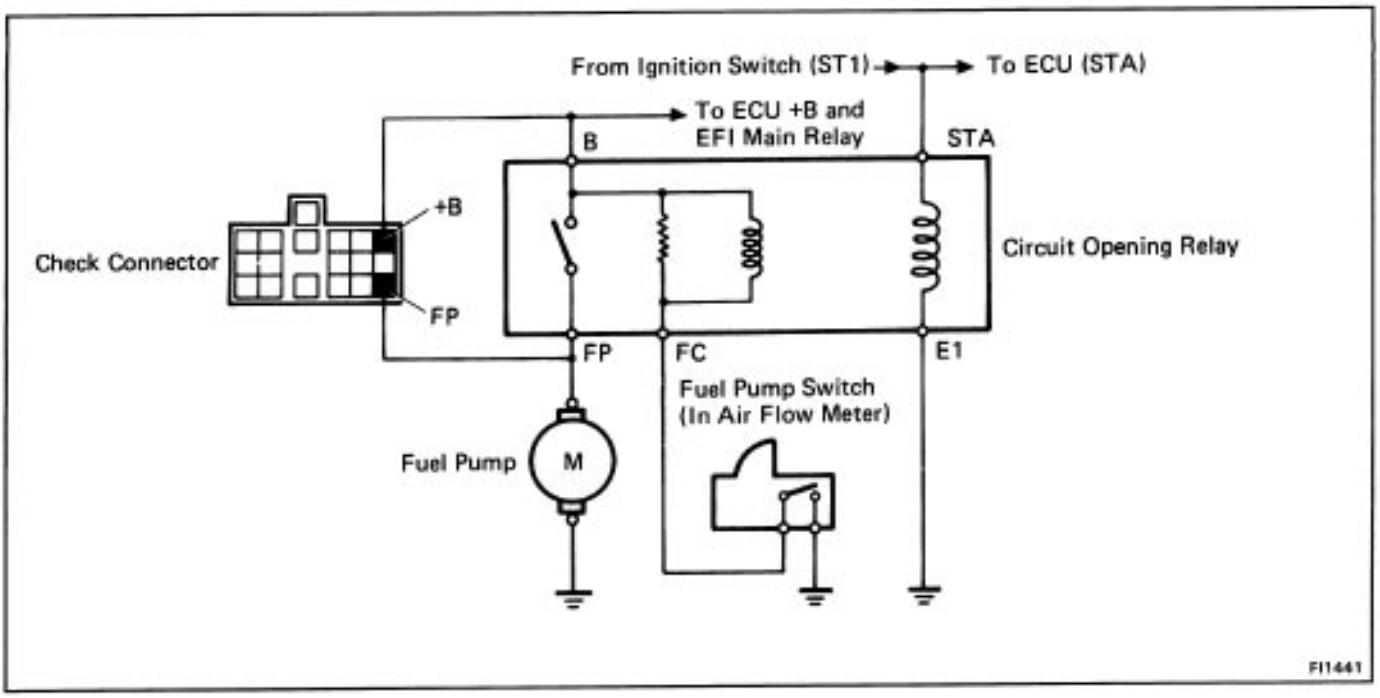
2. INSPECT RELAY OPERATION

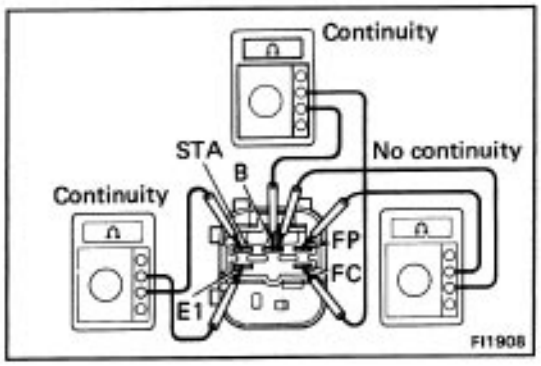
(a) Apply battery voltage across terminals 3 and 4.

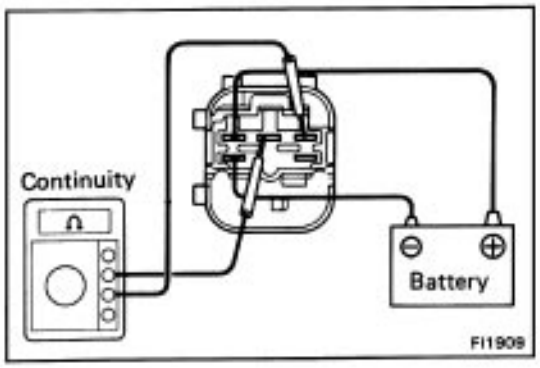
(b) Check that there is continuity between terminals 1 and 2.

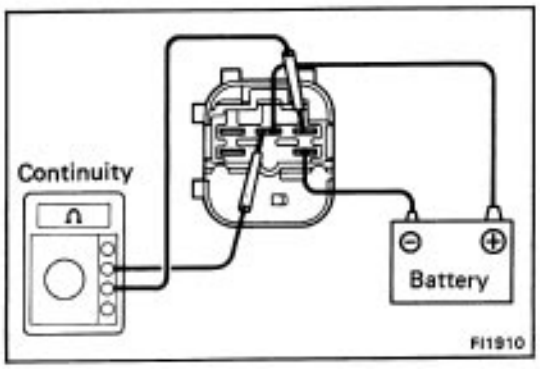
If operation is not as specified, replace the relay.

Circuit Opening Relay









INSPECTION OF CIRCUIT OPENING RELAY

1. INSPECT RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals STA and E1.

(b) Check that there is continuity between terminals B and FC.

(c) Check that there is no continuity between terminals B and FP.

If continuity is not as specified, replace the relay.

2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals STA and E1.

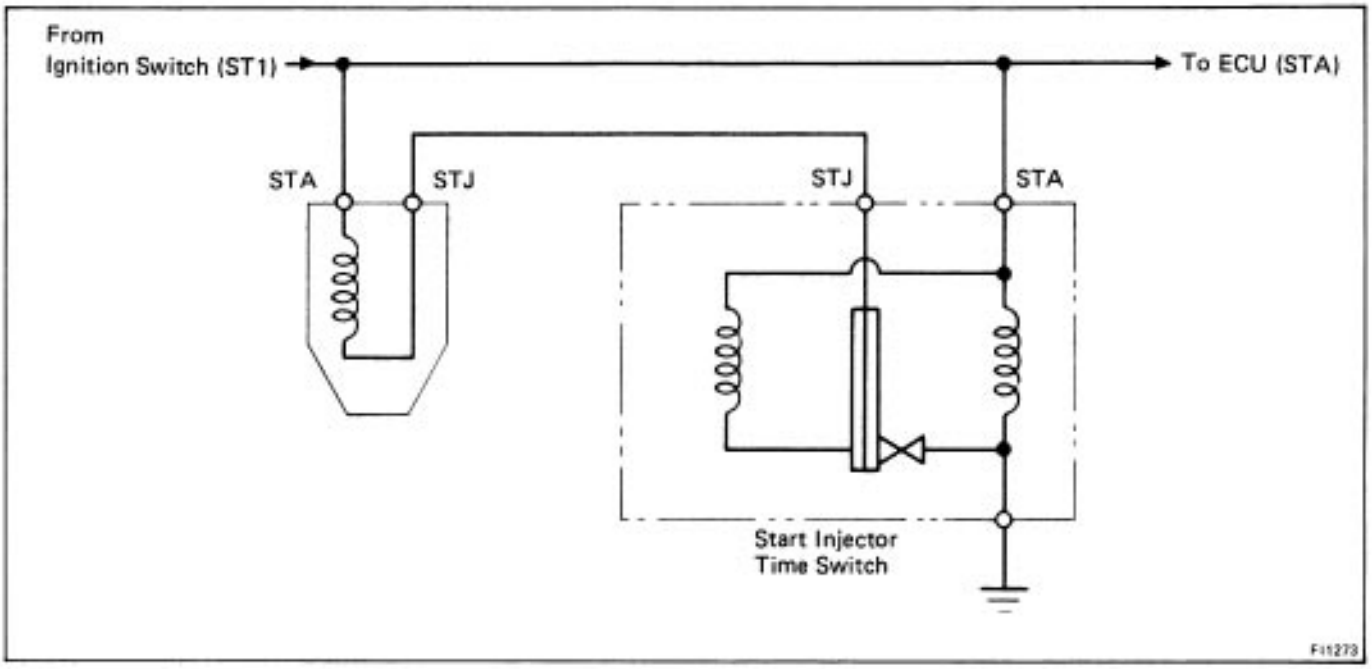
(b) Using an ohmmeter, check that there is continuity between terminals B and FP.

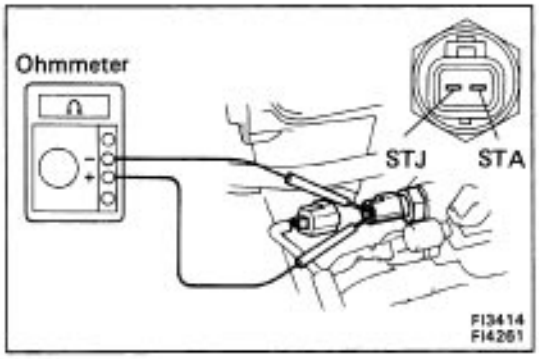
(c) Apply battery voltage across terminals B and FC.

(d) Check that there is continuity between terminals B and FP.

If operation is not as specified, replace the relay.

Start Injector Time Switch





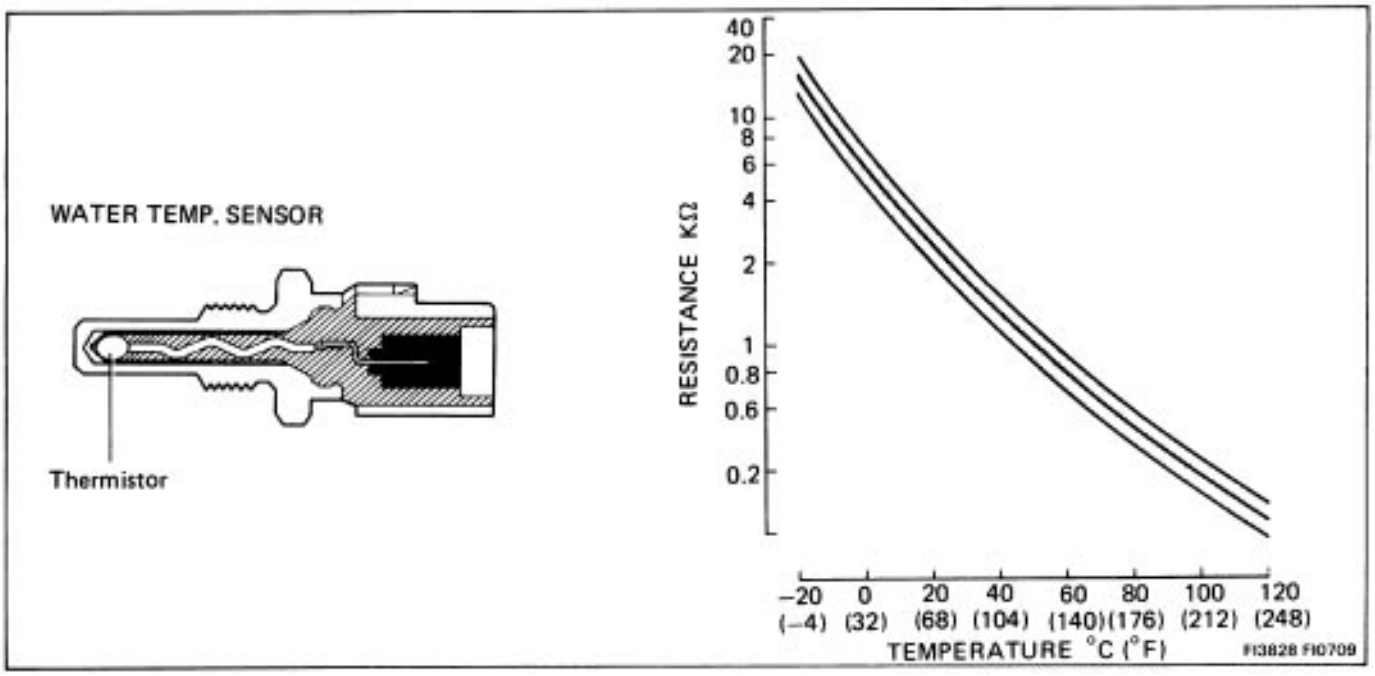
INSPECTION OF START INJECTOR TIME SWITCH

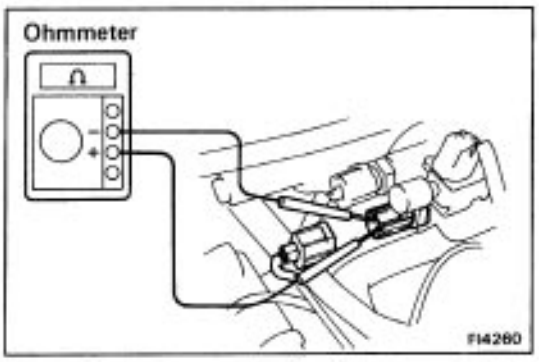
(a) Disconnect the connector.

(b) Using an ohmmeter, measure the resistance between each terminal.

STA – STJ	20 – 40	Below 30°C (86°F)
	40 – 60	Above 40°C (104°F)
STA – Ground	20 – 80	—

Water Temp. Sensor





INSPECTION OF WATER TEMP. SENSOR

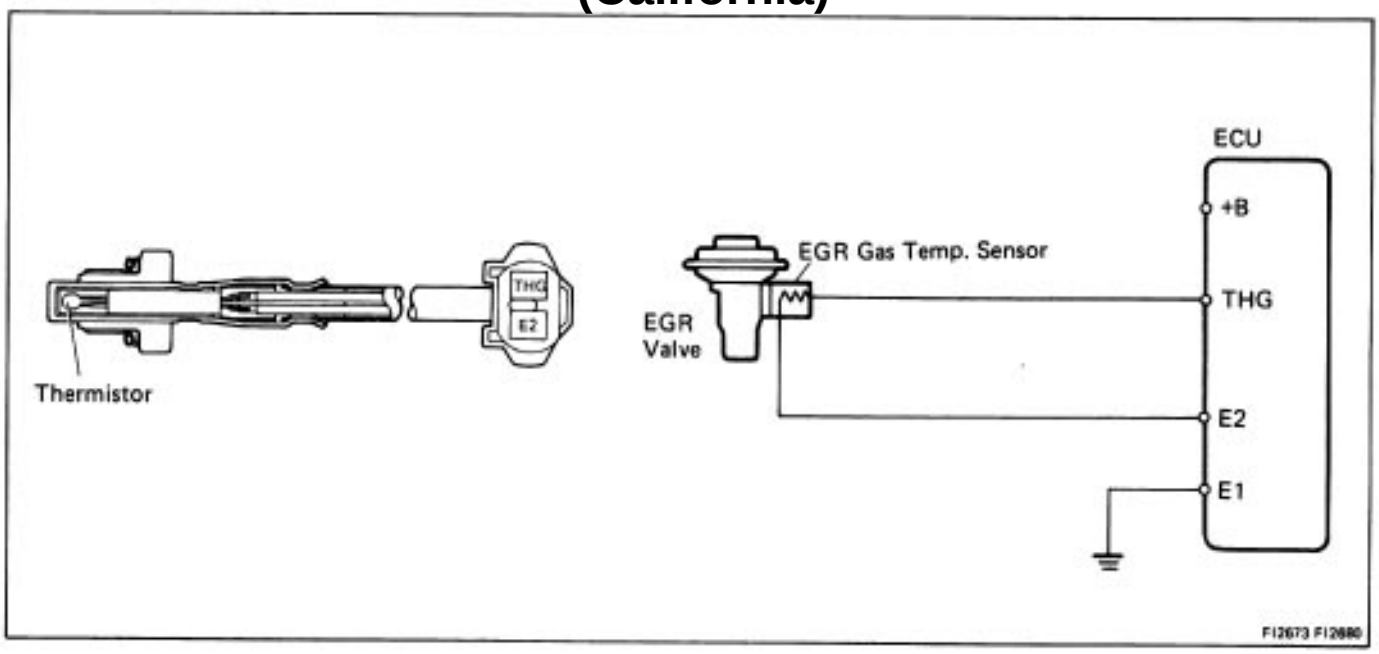
(a) Disconnect the connector.

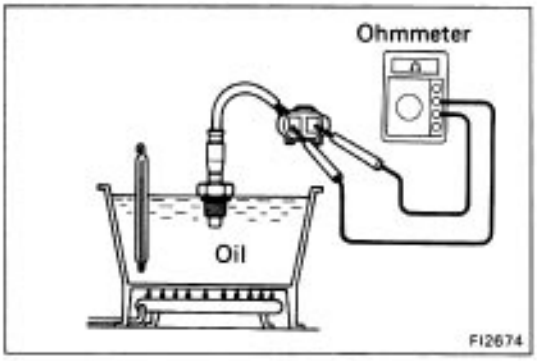
(b) Using an ohmmeter, measure the resistance between both terminals.

Resistance: Refer to the chart above.

If the resistance is not as specified, replace the sensor.

EGR Gas Temperature Sensor (California)





INSPECTION OF EGR GAS TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance:

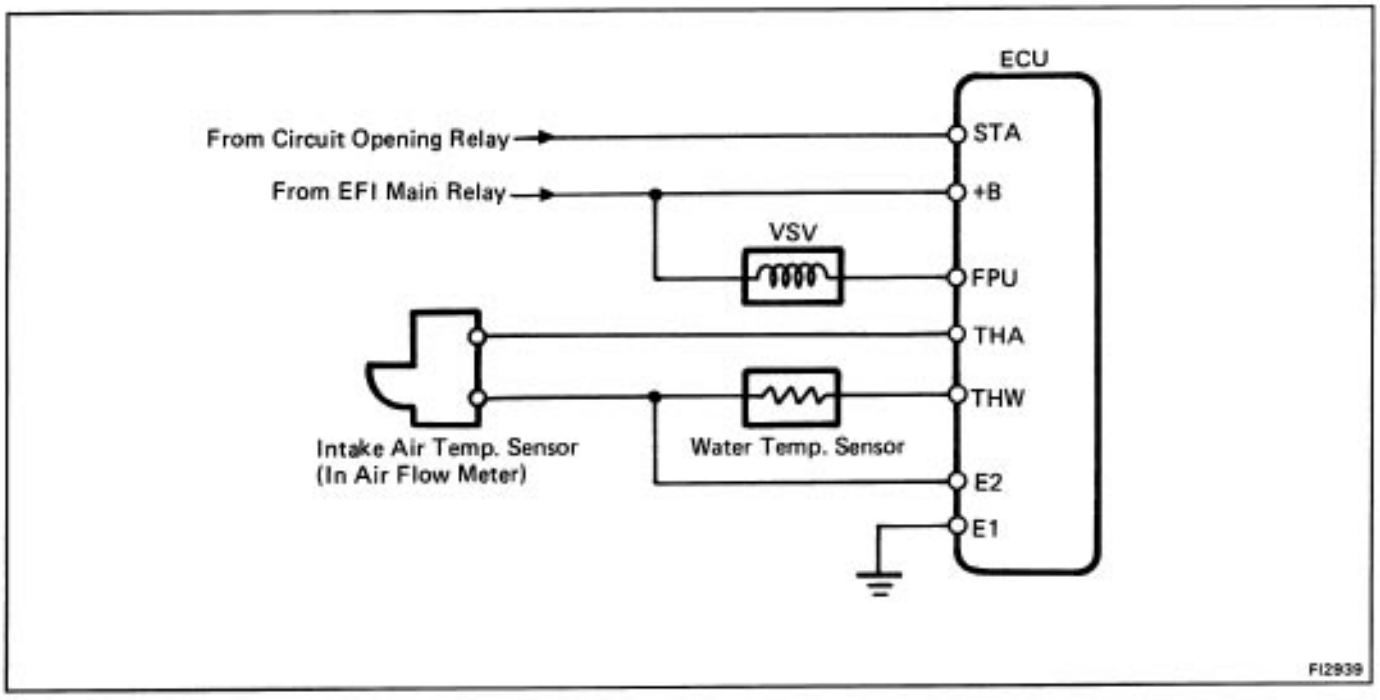
69.40 – 88.50 kΩ at 50˚C (112˚F)

11.89 – 14.37 kΩ at 100˚C (212˚F)

2.79 – 3.59 kΩ at 150˚C (302˚F)

If the resistance is not as specified, replace the sensor.

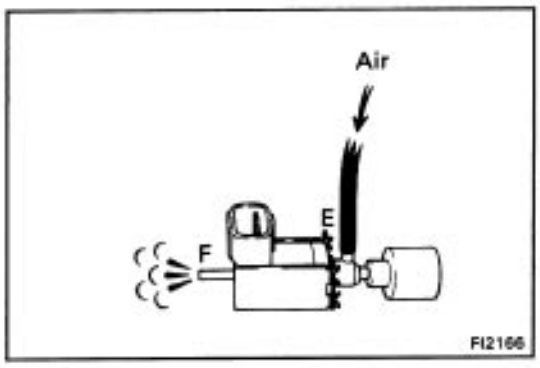
Fuel Pressure Control System



INSPECTION OF FUEL PRESSURE CONTROL SYSTEM

1. INSPECT WATER TEMPERATURE SENSOR
(See page FI–159)

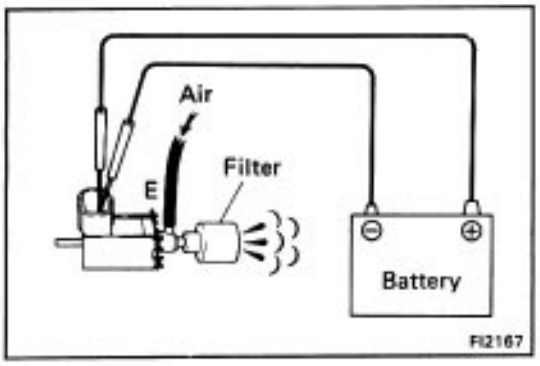
2. INSPECT INTAKE AIR TEMPERATURE SENSOR
(See page FI–147)



3. INSPECT VSV

HINT: The VSV is located in the intake manifold right side.

(a) Blow air into pipe E and check that air flows from pipe E to pipe F.

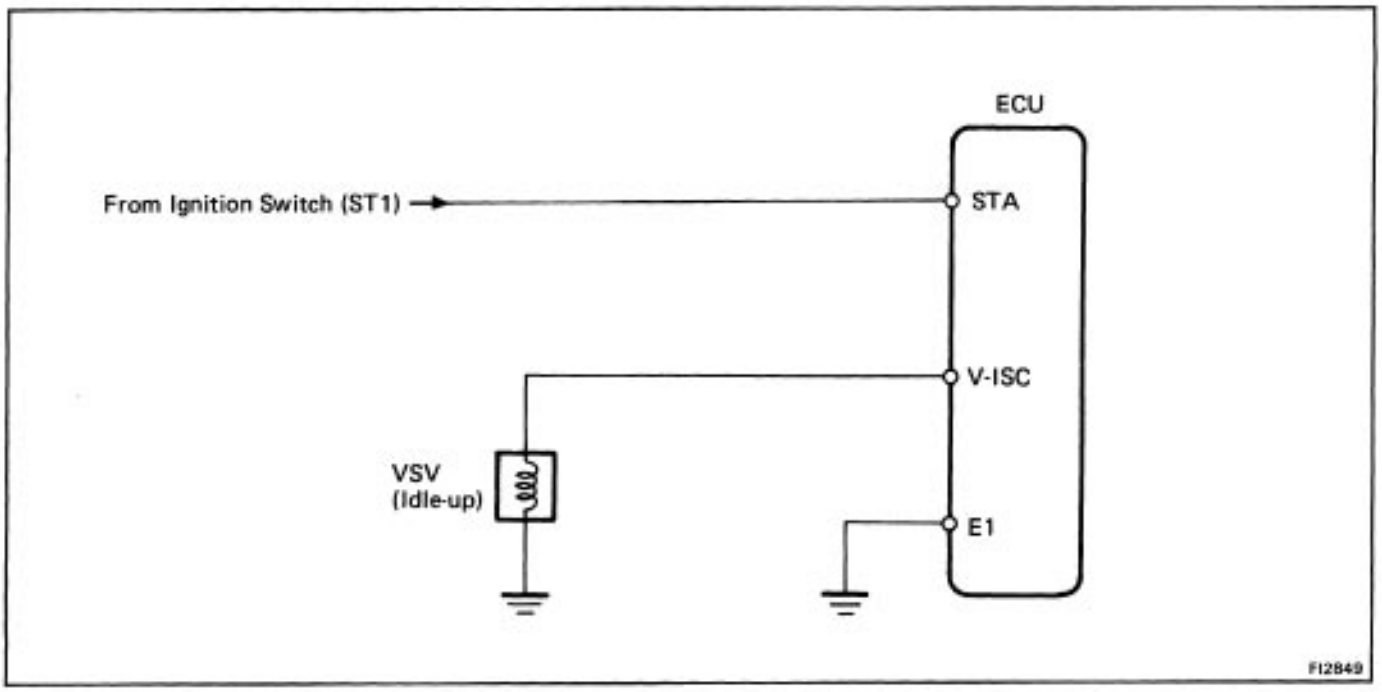


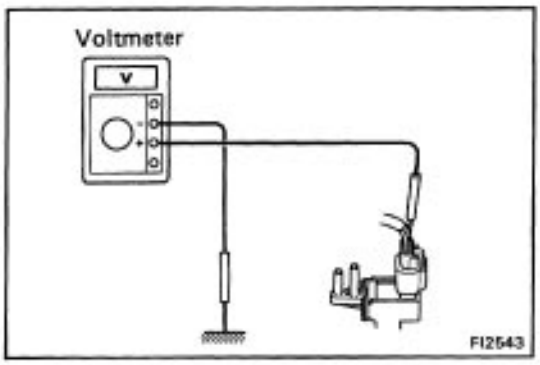
(b) Apply battery voltage across the terminals.

(c) Check that air flows from pipe E to the filter.

If operation is not as specified, replace the VSV.

Idle–up System



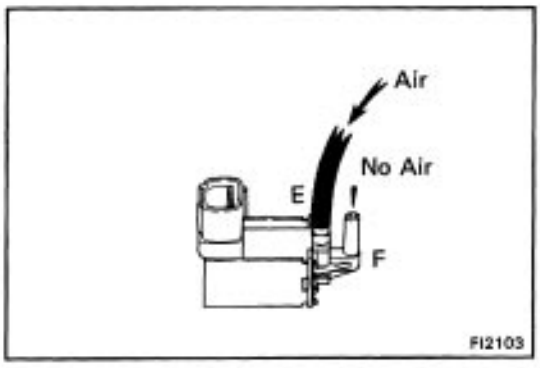


INSPECTION OF VSV (Idle–up)

1. MEASURE BATTERY VOLTAGE OF VSV

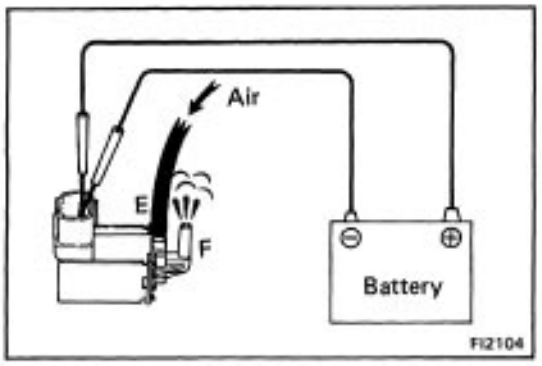
(a) All accessories switched ”OFF”.

(b) Using a voltmeter, check that the meter indicates battery voltage during cranking and for ten seconds after starting.



2. INSPECT VSV OPERATION

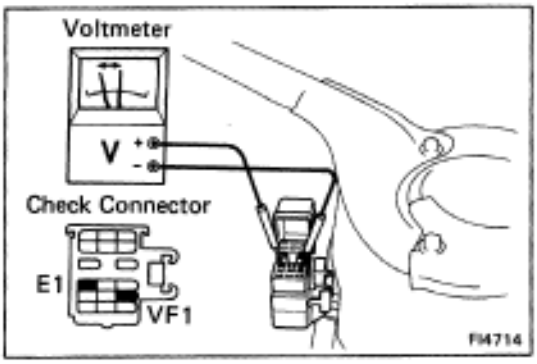
(a) Blow air into pipe E and check that air flows from pipe E to pipe F.



(b) Apply battery voltage across the terminals.

(c) Check that air flows from pipe E to pipe F.

If operation is not as specified, replace the VSV.



Main Oxygen Sensor

INSPECTION OF FEEDBACK VOLTAGE (VF)

1. Warm up the engine.
2. Connect the voltmeter to the check connector terminals VF1 and E1.

Warm up the oxygen sensor with the engine at 2,500 rpm for approx. 120 seconds.

Using SST, connect terminals TE1 and E1 of the check connector.
SST 09843–18020
And maintain engine speed at 2,500 rpm.

Check the number of times the voltmeter needle fluctuates in 10 seconds.

- Less than 6 times → Warm up the oxygen sensor with the engine at 2,500 rpm for approx. 120 seconds. And maintain engine speed at 2,500 rpm.
- 6 times or more → Normal
- Zero → Replace the ECU. → After replacing the oxygen sensor → Check the number of times the voltmeter needle fluctuates in 10 seconds.

Check the number of times the voltmeter needle fluctuates in 10 seconds.

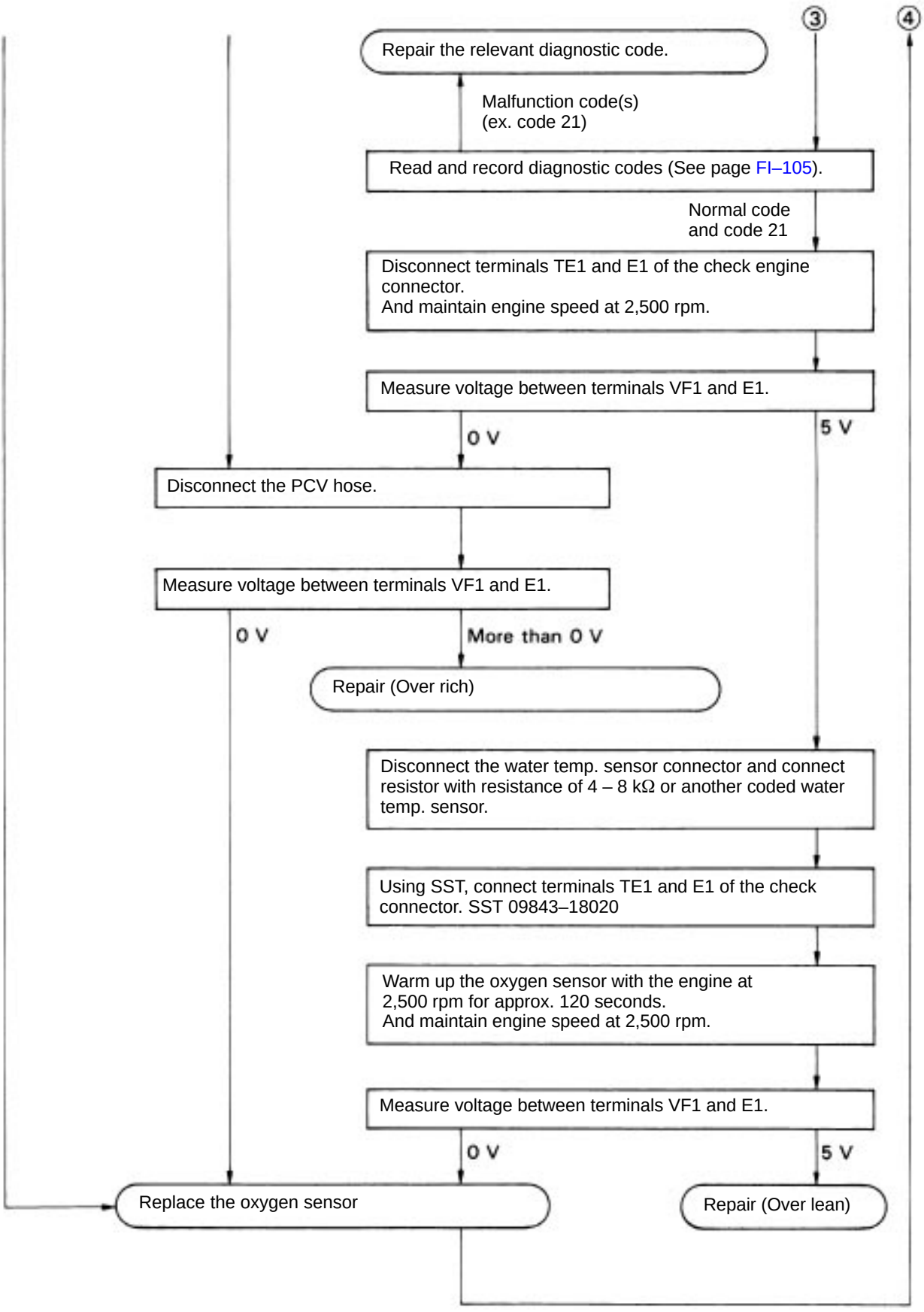
- 6 times or more → Normal
- Zero → Replace the ECU. → After replacing the oxygen sensor → Check the number of times the voltmeter needle fluctuates in 10 seconds.
- Less than 6 times → Disconnect terminals TE1 and E1 of the check connector.
And maintain engine speed at 2,500 rpm.

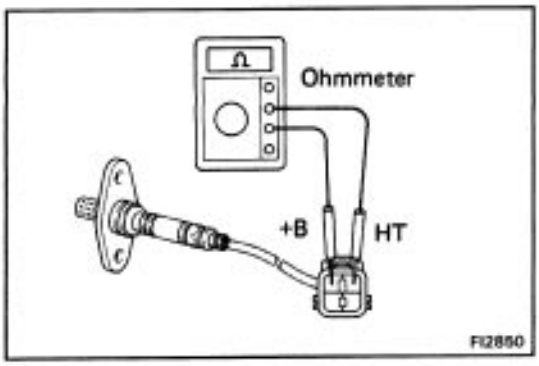
Measure voltage between terminals VF1 and E1.

- More than 0 V → ①
- 0 V → Read and record diagnostic codes.
  - Normal code and code 21 → ②
  - Malfunction code(s) (ex. code 21) → Repair the relevant diagnostic code.

CONTINUED ON PAGE FI–164

CONTINUED FROM PAGE FI–163





3. INSPECT HEATER RESISTANCE OF OXYGEN SENSOR

Using an ohmmeter, measure the resistance between the terminals + B and HT.

Resistance: .

Federal and Canada

4.95 – 6.05 Ω at 20˚C (68˚F)

California

5.1 – 6.3 Ω at 20˚C (68˚F)

If the resistance is not as specified, replace the sensor.

Sub–Oxygen Sensor (California)

INSPECTION OF SUB–OXYGEN SENSOR

HINT: Inspect only when code No.27 is displayed.

(a) Diagnostic code cancellation.
(See page FI–107)

(b) Warm up the engine until it reaches normal operating temperature.

(c) Drive for 3 minutes or more between 65 km/h (40 mph) and 100 km/h (62 mph) in 4th or 5th gear.

(d) Following the conditions in step (C), press fully on the accelerator pedal and keep engine speed at 3,000 rpm or more for at least 10 seconds.

HINT: Do not exceed 100 km/h (62 mph), or diagnostic code will not operate.

(e) Stop the vehicle and turn the ignition switch OFF.

(f) Carry out steps (b), (c) and (d) again to test acceleration.

If code No. 27 reappears, check the sub–oxygen sensor circuit. If the circuit is normal, replace the sub–oxygen sensor.

Engine Electronic Control Unit (Engine ECU)

INSPECTION OF ENGINE ECU

HINT: The EFI circuit can be checked by measuring the resistance and voltage at the wiring connectors of the ECU.

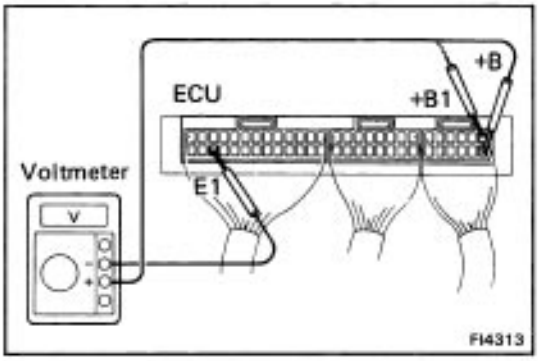
1. INSPECT VOLTAGE OF ECU

Check the voltage between each terminal of the wiring connectors.

- Turn the ignition switch ON.
- Measure the voltage at each terminal.

HINT:

- Perform all voltage measurements with the connectors connected.
- Verify that the battery voltage is 11 V or more when the ignition switch is ON.

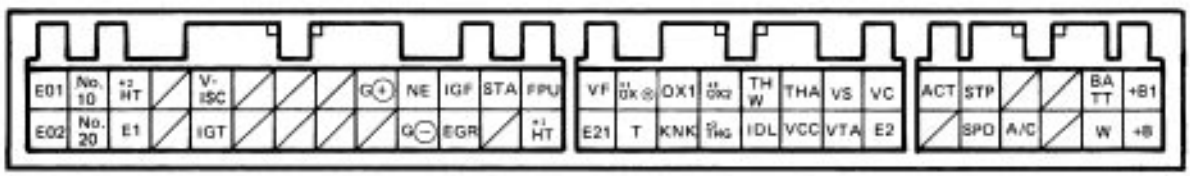


Terminals of ECU

Symbol	Terminal	Symbol	Terminal	Symbol	Terminal
E01	Engine ground (Power)	NE	Engine revolution sensor	THA	Intake air temp. sensor
E02	Engine ground (Power)	G⊖	Engine revolution sensor	VCC	Throttle position sensor
No.10	Injector	IGF	Igniter	VS	Air flow meter
No.20	Injector	EGR	VSV (EGR)	VTA	Throttle position sensor
*2HT	Oxygen sensor heater	STA	Starter switch	VC	Air flow meter
E1	Engine ground	–	–	E2	Sensor ground
–	–	FPU	VSV (Fuel pressure control)	ACT	A/C amplifier
–	–	*1HT	Oxygen sensor heater	–	–
V-ISC	VSV (Idle–up)	VF	Check connector	STP	Stop light switch
IGT	Igniter	E21	Sensor ground	SPD	Speedometer sensor
–	–	*1OX⊕	Oxygen sensor	–	–
–	–	T	Check connector	A/C	A/C magnet clutch
–	–	OX1	Main oxygen sensor	–	–
–	–	KNK	Knock sensor	–	–
–	–	*2OX2	Sub–oxygen sensor	BATT	Battery
–	–	*2THG	EGR gas temp. sensor	W	Warning light
G⊕	Engine revolution sensor	THW	Water temperature sensor	+B1	EFI main relay
–	–	IDL	Throttle position sensor	+B	EFI main relay

ECU Terminals

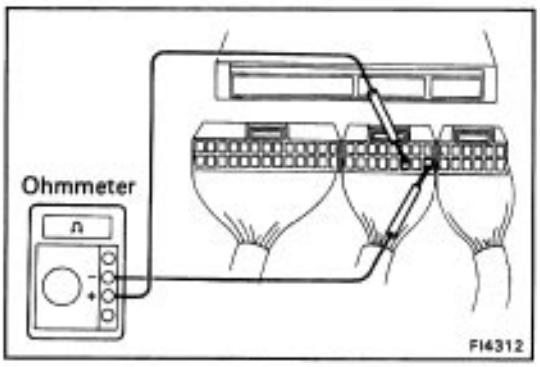
*1: Federal and Canada, *2: California



FI4285

Voltage at ECU Wiring Connectors

Terminals	STD Voltage	Condition	
BATT – E1	10 – 14	–	
+B – E1		Ignition switch ON	
+B1 – E1			
IDL – E2	10 – 14	Ignition switch ON	Throttle valve open
VC – E2	6 – 10	Ignition switch ON	–
VTA – E2	0.1 – 1.0		Throttle valve fully closed
	4 – 5		Throttle valve fully open
VCC – E2	4 – 6	Ignition switch ON	
VS – E2	2 – 5.5	Ignition switch ON	Measuring plate fully closed
	6 – 9		Measuring plate fully open
	2 – 8	Idling	
THA – E2	1 – 3	Ignition switch ON	Intake air temperature 20˚C (68˚F)
THW – E2	0.1 – 1.0	Ignition switch ON	Coolant temperature 80˚C (176˚F)
STA – E1	6 – 14	Cranking	
No.10 – E01 No.20 – E02	10 – 14	Ignition switch ON	
IGT – E1	0.7 – 1.0	Idling	
T – E1	10 – 14	Ignition switch ON	Check connector TE1 – E1 not connected
	0.5 or less		Check connector– TE1 – E1 connected
A/C – E1	5 – 14	Ignition switch ON	A/C switch ON
	0.5 or less		A/C switch OFF
W – E1	0.5 or less	Ignition switch ON	
	10 – 14	Engine start	



2. INSPECT RESISTANCE OF ECU

NOTICE:

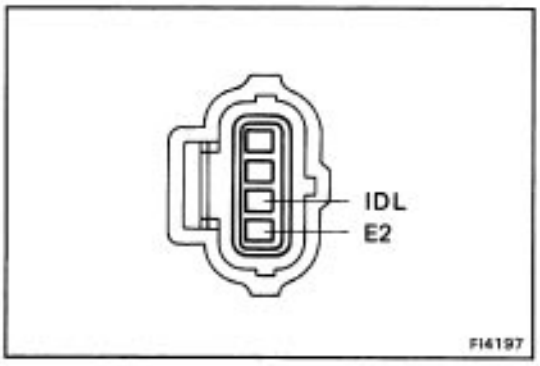
- **Do not touch the ECU terminals.**
- **The tester probe should be inserted into the wiring connector from the wiring side.**

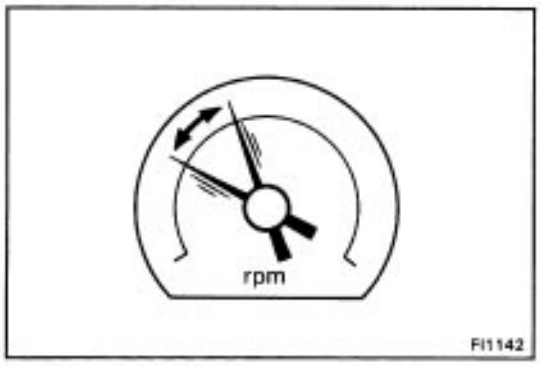
Check the resistance between each terminal of the wiring connectors.

- Disconnect the connectors from the ECU.
- Measure the resistance at each terminal.

Resistance of ECU Wiring Connectors

Terminals	Condition	Resistance
IDL – E2	Throttle valve open	Infinity
	Throttle valve fully closed	Less than 2.3 kΩ
VTA – E2	Throttle valve fully open	3.3 – 10 kΩ
	Throttle valve fully closed	0.2 – 0.8 kΩ
VC – E2	–	100 – 300 Ω
VS – E2	Measuring plate fully closed	20 – 400 Ω
	Measuring plate fully open	20 – 3,000 Ω
VCC – E2	–	3 – 7 kΩ
THA – E2	Intake air temperature 20°C (68°F)	2 – 3 kΩ
THW – E2	Coolant temperature 80°C (176°F)	0.2 – 0.4 kΩ
G ⊕ – G ⊖	–	205 – 255 Ω





Fuel Cut RPM

INSPECTION OF FUEL CUT RPM

(a) Start and warm up the engine.

(b) Disconnect the throttle position sensor connector from the throttle position sensor.

(c) Connect terminals IDL and E2 on the wire connector side.

(d) Gradually raise the engine rpm and check that there is fluctuation between the fuel cut and fuel return points.

HINT: The vehicle should be stopped.

Fuel cut rpm: 1,600 rpm (A/C OFF)
1,900 rpm (A/C ON)
Fuel return rpm: 1,200 rpm (A/C OFF)
1,500 rpm (A/C ON)