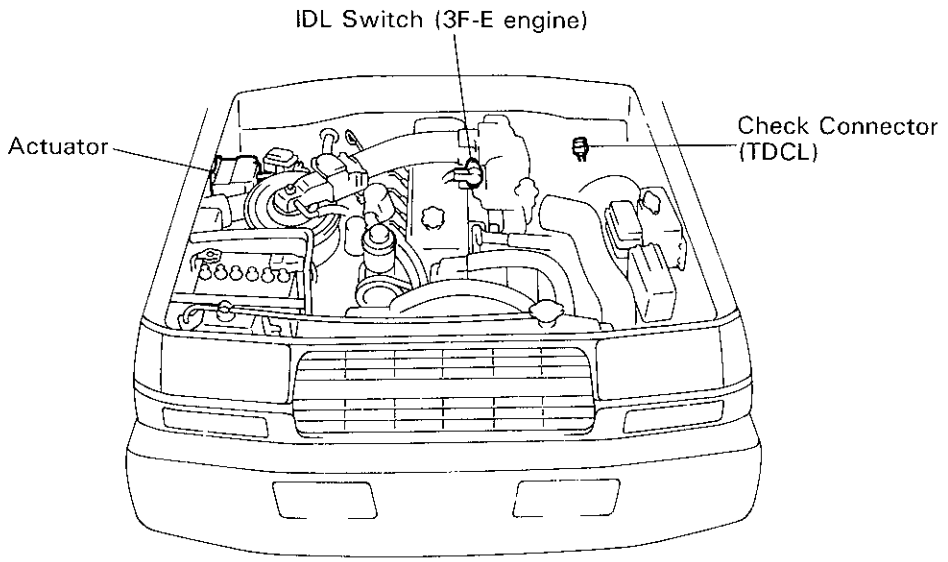
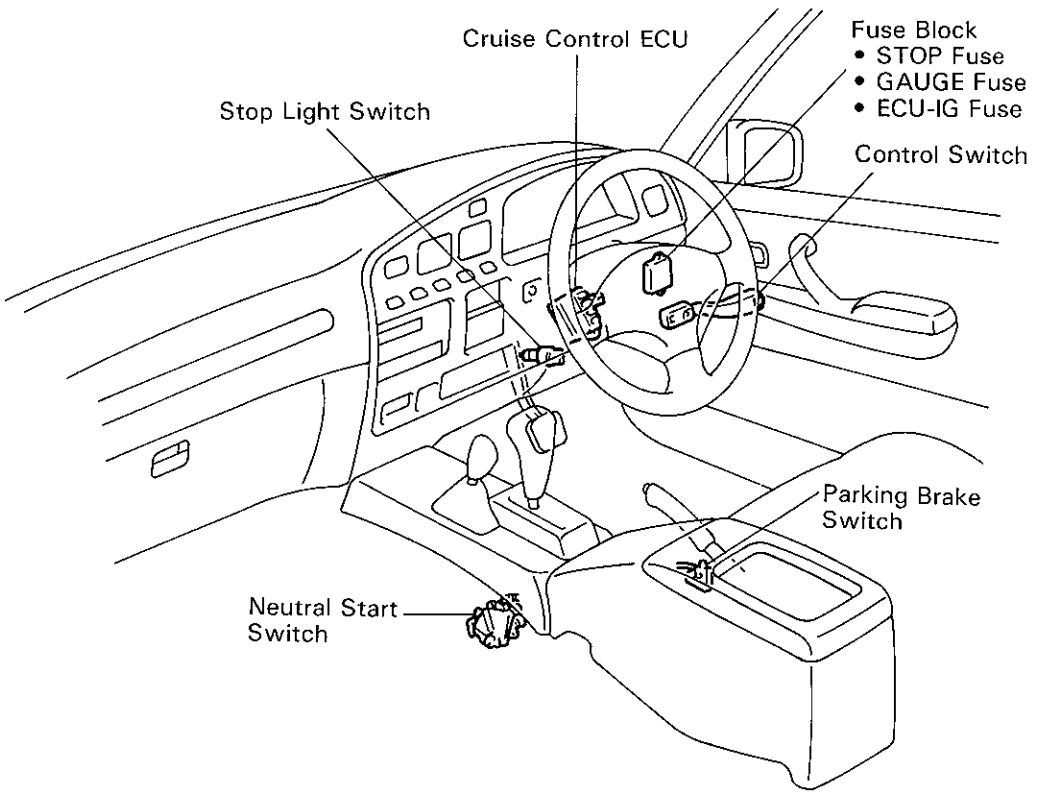
CRUISE CONTROL SYSTEM

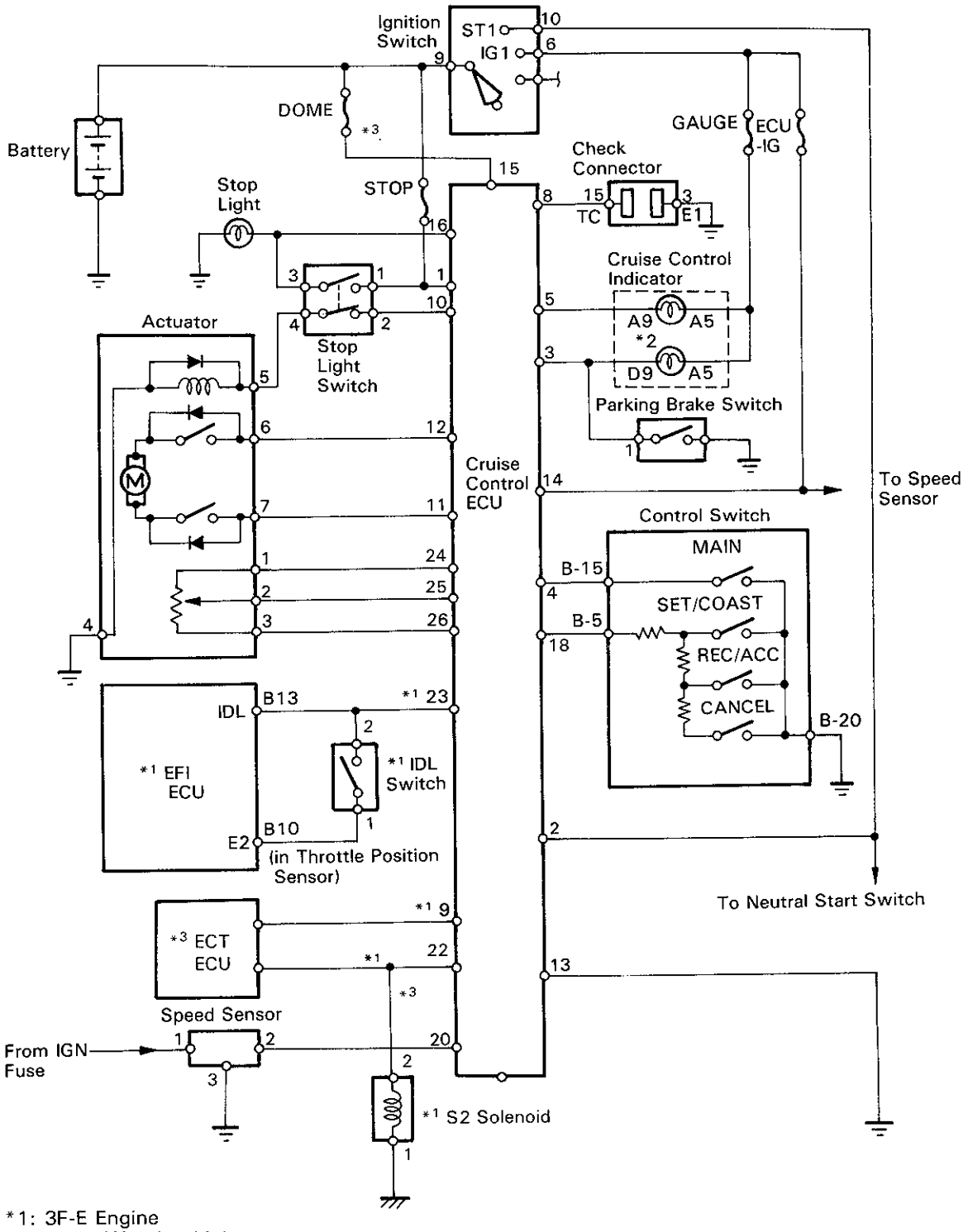
Parts Location





BE5263
N04081

Wiring Diagram



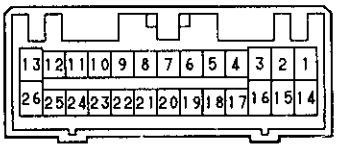
*1: 3F-E Engine
*2: Brake Warning Light
*3: 1FZ-FE Engine
⬚: Combination Meter

The POWER SOURCE CIRCUIT has been simplified. For full details, see pub. No. RM184E, pages BE-10, 11.

N04082

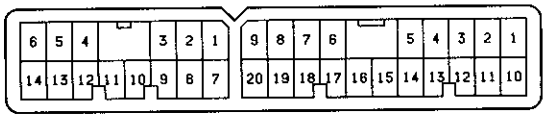
Connector Diagrams

Cruise Control ECU

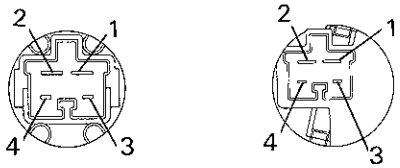


Control Switch (in Combination Switch)

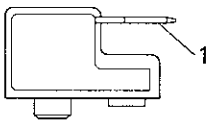
Connector "A" Connector "B"



Stop Light Switch



Parking Brake Switch



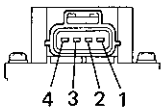
Speed Sensor



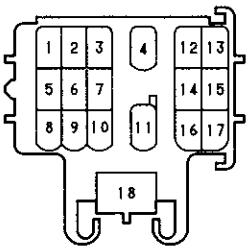
Actuator



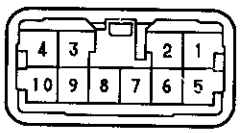
Throttle Position Sensor (1FZ-FE)



Check Connector (TDCL)

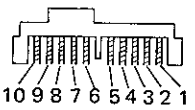


Ignition Switch



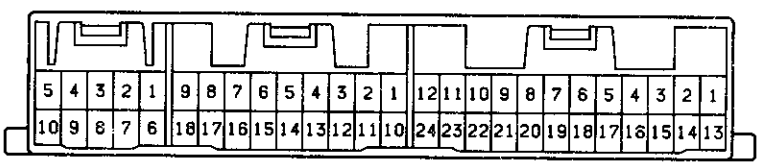
Combination Meter (Cruise Control Indicator)

Connector "A"



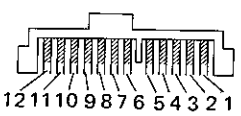
EFI ECU (3F-E)

Connector "C" Connector "B" Connector "A"



(Brake Warning)

Connector "D"



Vd-26-2-B V-34-2
BE6234 BE6233 BE1412 IS-3-2-A
Ie-7-2 AC2241
BE2576
e-10-2-B SH-18-1 BE1266
R-52-2

System Description

- When the ignition switch is turned ON, current flows from the battery to terminal 14 of the cruise control (CC) ECU.
- Terminal 13 of the CC ECU is always grounded.

Basic Operation

HINT: For all explanations below, the ignition switch is in the ON position.

1. CONTROL SWITCH OPERATION

- The CC switch controls MAIN switch, SET/COAST, RESUME/ACCEL and CANCEL functions.

(a) MAIN switch
When the main switch is pushed ON, current flows from terminal 4 of the CC ECU → terminal 5 of the control switch→ terminal 3 of the switch → ground.

As a result, the CC ECU is on standby and terminal 5 of the CC ECU is grounded. Therefore the CC indicator lights up.

(b) SET/COAST, RESUME/ACCEL and CANCEL switch
The control switch controls the SET, COAST, RESUME, ACCEL and CANCEL functions. When the control switch is turned to each position, current flows from terminal 18 of the CC ECU → terminal 4 of the control switch → (each resistance) → terminal 3 of the switch → ground.

In the way, the CC ECU detects each position the control switch is turned to, and starts operation.

HINT: The SET function is detected by the CC ECU when the control switch released from SET/COAST.

2. SPEED CONTROL OPERATION

When the vehicle speed is set by the control switch, the ECU sends signal from terminal 10 → terminal 2 of the stop light switch → terminal 4 of the switch → terminal 5 of the actuator → (safety magnetic clutch) → terminal 4 of the actuator → ground.

At the same time, the CC ECU sends the signal from terminal 24 → terminal 1 of the actuator → (position sensor)→ terminal 3 of the actuator → terminal 26 of the CC ECU. When the occurs, the position sensor sends the position of the actuator arm as a signal (voltage) from terminal 2 of the actuator to terminal 25 of the CC ECU.

When the actual vehicle speed drops below the set speed, the CC ECU sends a signal (voltage) from terminal 12 → terminal 6 of actuator → (motor) → terminal 7 of actuator → terminal 11 of CC ECU. This causes the motor to rotate the actuator arm in the throttle opening direction, increasing the vehicle speed. Then, when the arm reaches the prescribed angle, the CC ECU detects this at terminal 25 and stops the signal from 12.

When the actual vehicle speed rises above the set speed, the CC ECU sends a signal from terminal 11, turning the motor in the opposite direction so that the vehicle speed is reduced.

3. MANUAL CANCEL OPERATION

The CC system has the following methods of cancellation:

- **Speed Control Switch (CANCEL)**

  When the control switch is turned to CANCEL position.

- **Parking Brake Switch**

  When the parking brake lever is pulled, the parking brake switch is turned ON and sends a cancellation signal (ground voltage) to terminal 3 of the CC ECU.

- **Neutral Start Switch (A/T)**

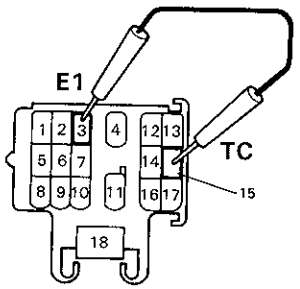
  When the shift lever is set to "N" or "P" range, the neutral start switch is turned ON and sends a cancellation signal (ground voltage) to terminal 2 of the CC ECU.

- **Stop Light Switch**

  When the brake pedal is depressed, SW B of the stop light switch is turned OFF, the safty magnetic clutch (in actuator) is released, and SW A of the stop light switch is turned ON and sends a cancellation signal (battery voltage) to terminal 16 of the CC ECU.

When the CC ECU detects any of the above signals, it stops output of signals to the actuator, and cancels cruise control.

Diagnosis Check Connector



DIAGNOSTIC SYSTEM

(Type B)

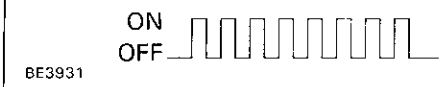
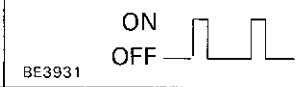
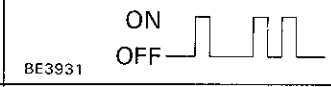
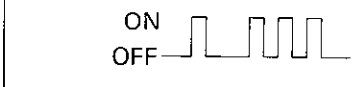
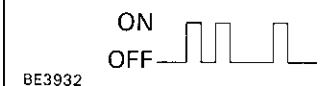
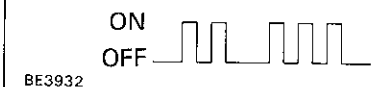
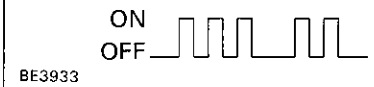
(a) If while driving with the cruise control on, the system is canceled by a malfunction in either the actuator, speed sensor or speed control switch circuit, the cruise control indicator light "CRUISE" will blink 5 times.

(b) While stopped, connect terminals 3 and 15 of the check connector.

HINT: If the ignition switch is turned off, the diagnostic code will be erased from the computer memory.

(c) Read the diagnostic code on the indicator light "CRUISE".

DIAGNOSTIC CODE

Code No.	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
—	 BE3931	Normal
11	 BE3931	• Duty ratio of 100% output to motor acceleration side. • Overcurrent (short) in motor circuit.
12	 BE3931	• Overcurrent (short) in magnet clutch circuit. • Open in magnet clutch circuit for 0.8 sec.
13	 BE3931	• Open in actuator motor circuit. • Position sensor detects abnormal voltage. • Position sensor signal value does not change when the motor operates.
21	 BE3932	• Speed signal is not input to the ECU while cruise control is set.
*23	 BE3932	• Actual vehicle speed has dropped by 16 km/h (10 mph) or more below the set speed.
32	 BE3933	• Short in control switch circuit.
34	 BE3933	• Voltage abnormality in control switch.
41	 BE3937	• When 41 code is indicated, replace the cruise control ECU.

HINT: When two or more codes are indicated, the lowest numbered code will be displayed first.

(*) When the vehicle speed is reduced on uphill roads, the speed can be set again and driving continued. (This is not a malfunction.)

Troubleshooting

You will find the source of the trouble more easily by properly using the table shown below. In this table, the numbers indicate the order of priority of the causes of trouble. Check each part in the order shown.

Chart No.					D	C	C	F	H	G	E	I	J		
Inspection Item / Diagnosis Code / Problem	Type B	Type A		CC ECU	Actuator	Main Switch (in Control Switch)	Control Switch	Stop Light Switch	Neutral Start Switch	Parking Brake Switch	Speed Sensor, or Speedometer Cable	ECT Solenoid No.2 Circuit	Throttle Position Sensor (1FZ-FE engine)	Speed Control Cable and Control Link	Other Parts
• "CRUISE" indicator light blinks 5 times. • Cruise control system does not set. • Cruise control system does not operate.	11			2	1										
	12			3	1			2							
	21			2							1				
	23				3						2			1	
	32			2			1								
	34			2			1								
	41			1											
	Normal	4	OK	8	7	1	2	3	4	5				6	9*
			NG	2							1				
Set speed deviates on high or low side.				4	3						1			2	
Large speed increase or speed drop when the speed control switch turned to SET.				3	2								1		
Vehicle speed fluctuates when speed control switch turned to SET.				4	3						1			2	
Set speed does not cancel when brake pedal depressed.	3	OK		3	1			2							
		NG		2				1							
Set speed does not cancel when parking brake lever pulled.	3	OK		2	1										
		NG		2						1					
Set speed does not cancel when shifted to "N" range.	3	OK		2	1										
		NG		2					1						
Vehicle speed does not decrease when speed control switch turned to COAST.	1	OK		4	1						3			2	
		NG		2			1								
Vehicle speed does not accelerate when speed control switch turned to ACCEL.	2	OK			1						3			2	
		NG		2			1								
Vehicle speed does not return to memorized speed when control switch turned on RESUME.	2	OK		4	1						3			2	
		NG		2			1								
Set speed does not cancel when speed control switch turned to CANCEL.	3	OK		2	1										
		NG		2			1								
Speed can be set below about 40 km/h (25 mph).	4	OK		2	1										
		NG		2							1				
Cruise control will not disengage even at about 40 km/h (25 mph).	4	OK		2	1										
		NG		2							1				
During autodrive operation, shift operation ocuurs frequently without control				2								1			
Acceleration response is sluggish when speed control switch turned to "ACCEL" or "RESUME".				6	3		1						5	2	

*: Inspect the wire harness.

C CONTROL SWITCH CIRCUIT

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

CONTROL SWITCH

Disconnect connector from control switch and inspect connector on wire harness side as follows.

INSPECT GROUND CONNECTION
Is there continuity between terminal 3 and ground?

No → • Open circuit in wire harness between terminal 3 of control switch and ground.
• Ground faulty.

Yes

INSPECT CONTROL SWITCH (See page BE-51)
Is control switch operation normal?

No → Replace control switch. Then recheck system.

Yes

CC ECU

Connect connector to control switch.
Disconnect connectors from CC ECU and inspect connectors on wire harness side as follows.

INSPECT MAIN SWITCH CIRCUIT
Is there continuity between terminal 4 and ground with main switch OFF?

Yes → Short circuit in wire harness between terminals 4 of CC ECU and 5 of control switch.

No

Is there continuity between terminal 4 and ground with main switch ON?

No → Open circuit in wire harness between teminals 4 of CC ECU and 5 of control switch.

Yes

INSPECT CONTROL SWITCH CIRCUIT
Is there continuity between terminal 18 and ground with control switch OFF?

Yes → Short circuit in wire harness between terminals 18 of CC ECU and 4 of control switch.

No

Is there resistance as shown in table below between terminal 18 and ground when control switch is turned to each position?

Position	Resistance (Ω)
RES/ACC	Approx. 68
SET/COAST	Approx. 198
CANCEL	Approx. 418

No → Open circuit in wire harness between terminals 18 of CC ECU and 4 of control switch.

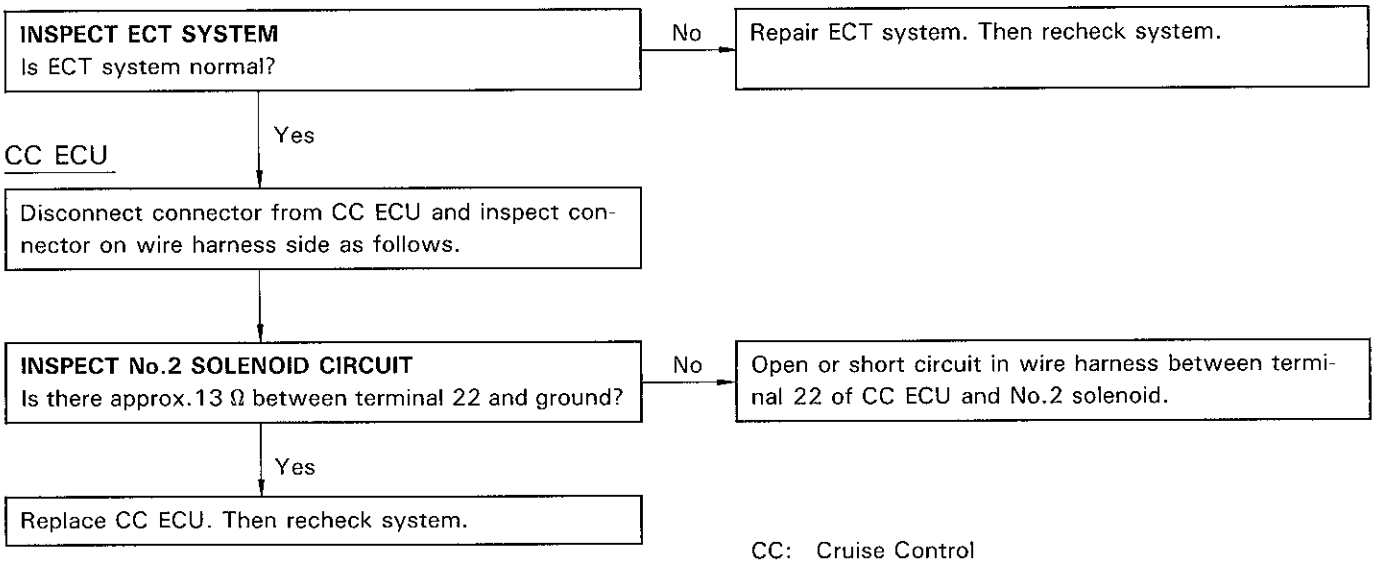
Yes

Replace CC ECU. Then recheck system.

CC: Cruise Control

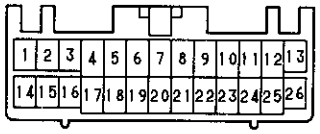
I ECT SOLENOID No.2 CIRCUIT (with A/T)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



CC: Cruise Control

Wire Harness Side



Vd-26-1-B

Cruise Control ECU Circuit

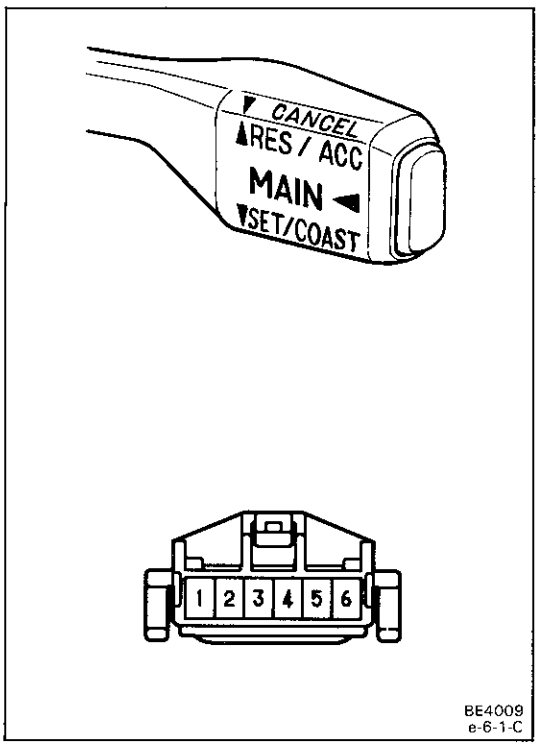
INSPECT ECU CIRCUIT

Disconnect connector and inspect connector on wire harness side as shown in the chart.

Check for	Measured item	Tester connection	Condition		Specified value
Continuity	Neutral start switch	2 — ground	Shift lever position	N or P	Continuity
				L, 2, D or R	No continuity
	Parking brake switch	3 — ground	Parking brake lever position	released	No continuity
				pulled	Continuity
	Control switch	4 — ground	Main switch position	OFF	No continuity
				ON	Continuity
	Ground connection	13 — ground	Constant		Continuity
	Actuator (motor)	*11 — 12	Actuator arm position	max. OPEN	(12 → 11) Continuity
				max. CLOSE	(11 → 12) Continuity
				any position except above position	(12 → 11) Continuity
	TDCL circuit	8 — ground	Constant		No continuity
			Terminals Tc and E1 connected		Continuity
	Throttle position sensor (IDL: 1FZ-FE Engine)	23 — ground	Acceleration pedal position	released	Continuity
				depressed	No continuity
	Speed sensor	20 — ground	With ignition switch ON, speedometer shaft or speed sensor shaft turned.		Continuity ↕ No continuity
Resistance	Actuator (position sensor)	24 — 26	Constant		Approx. 2 kΩ
		24 — 25	Actuator arm turned		Resistance change even
	Actuator (Safety magnetic clutch)	10 — ground	Brake pedal position	released	Approx. 38.5 Ω
				depressed	No continuity
	Control switch	18 — ground	Control switch position	OFF	No continuity
				RES/ACC	Approx. 68 Ω
				SET/COAST	Approx. 198 Ω
				CANCEL	Approx. 418 Ω
	ECT No.2 solenoid valve (A/T)	22 — ground	Constant		Approx. 13 Ω
Voltage	Power source	14 — ground	Ignition switch position	LOCK or ACC	No voltage
				ON	Battery voltage
	STOP fuse	1 — ground	Constant		Battery voltage
	Stop light	16 — ground	Brake pedal position	released	No voltage
				depressed	Battery voltage

*: This circuit includes the diode. If the circuit shown no continuity, change the positive and negative proves and recheck system.

If circuit is as specified, try another ECU.
If circuit is not as specified, refer to BE-42 wiring diagram and inspect the circuits connected to other parts.



Parts Inspection

INSPECT SWITCHES

(Control Switch)

(a) Check continuity between terminals 3 and 5.

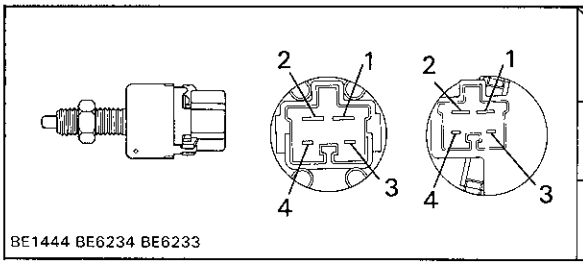
Main switch position	Condition
OFF	No continuity
ON	Continuity

(b) Measure resistance between terminals 3 and 4.

Control switch position	Resistance (Ω)
OFF	∞ (No continuity)
RES/ACC	Approx. 68
SET/COAST	Approx. 198
CANCEL	Approx. 418

If resistance value is not as specified, replace the control switch.

(Stop Light Switch/Continuity)



Terminal / Switch position	1	2	w/ CCS 3	w/ CCS 4
Switch pin free (Brake pedal depressed)	○——	——○		
Switch pin pushed in (Brake pedal released)			○——	——○

If continuity is not as specified, replace the switch.