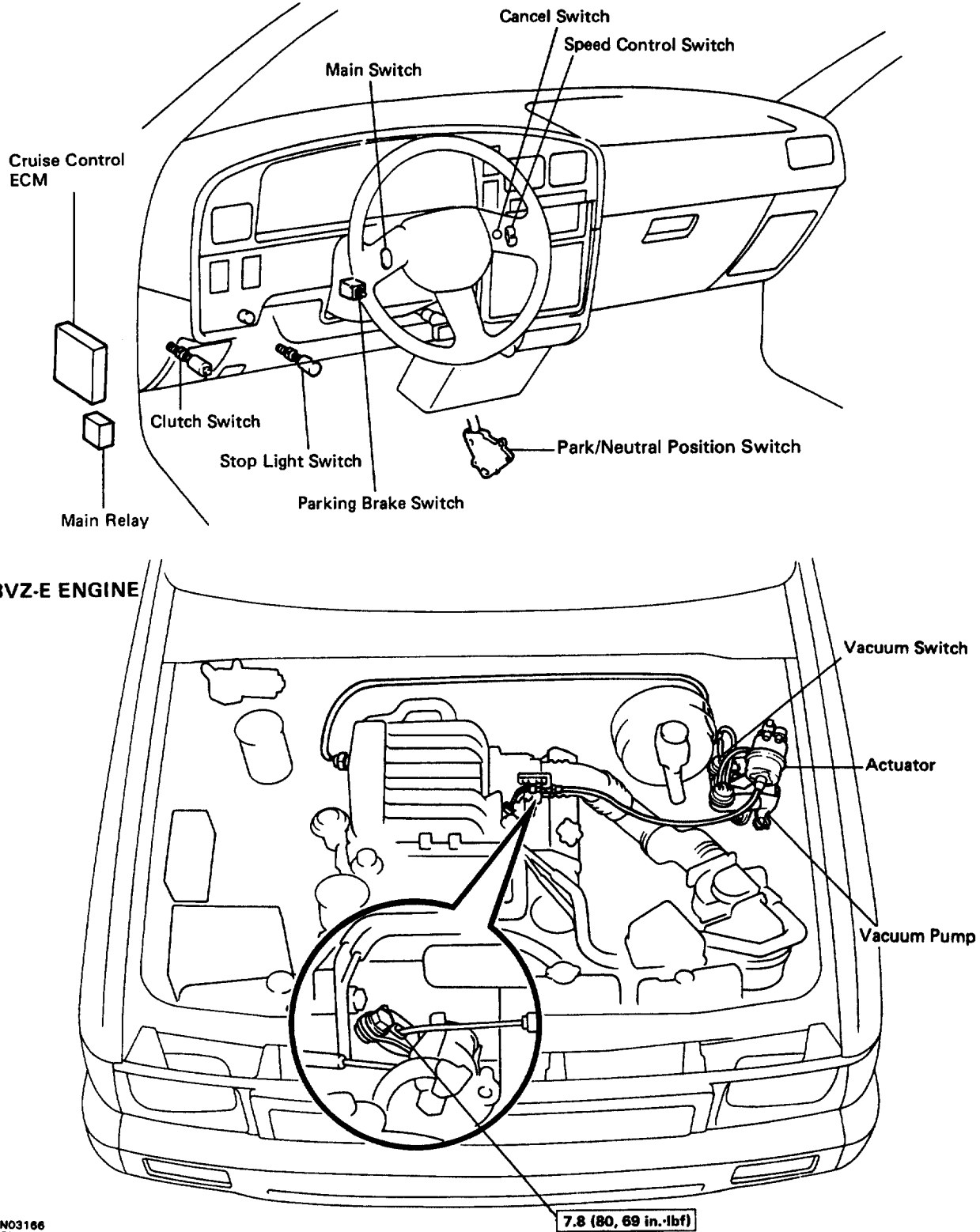
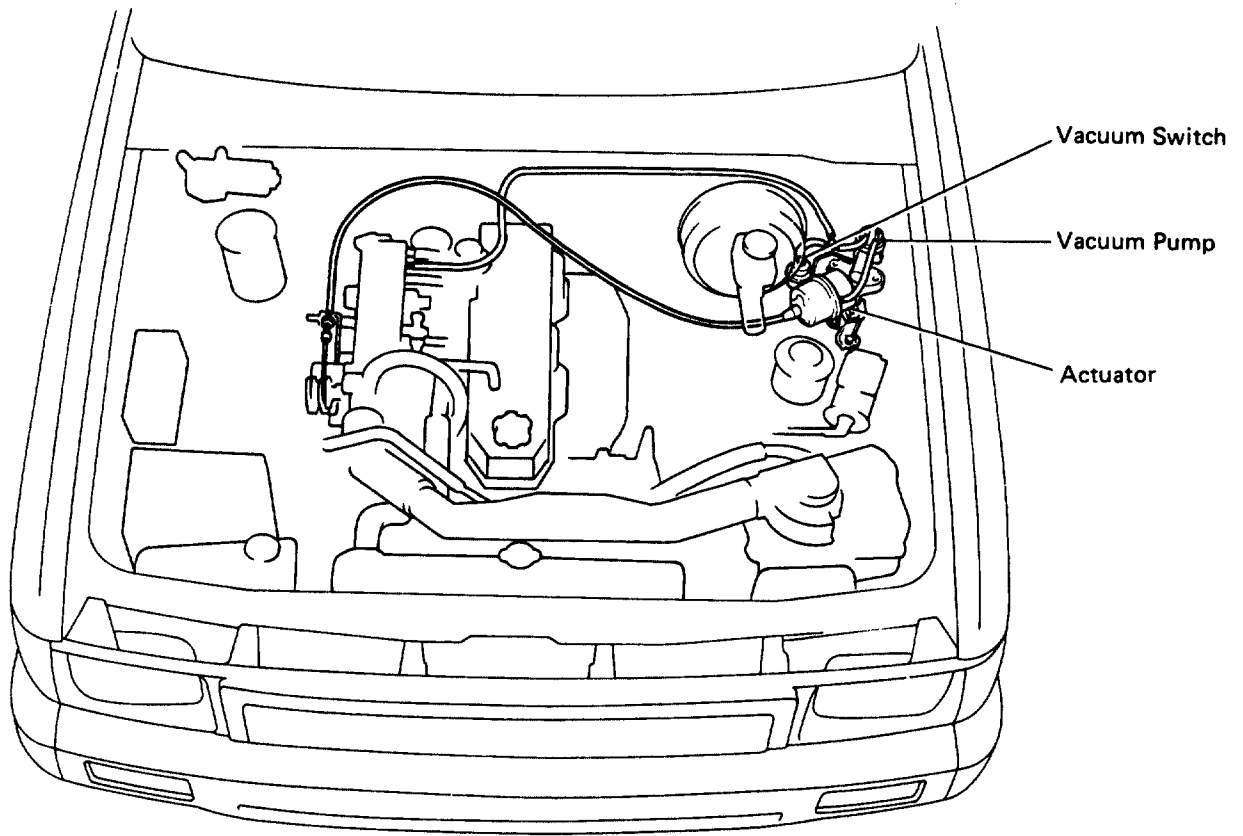


# CRUISE CONTROL SYSTEM PARTS LOCATION



N03166  
BE4422

**N·m (kgf·cm, ft·lbf) : Specified torque**

**22R-E ENGINE**

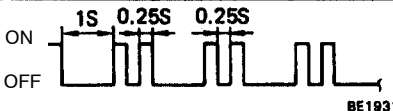


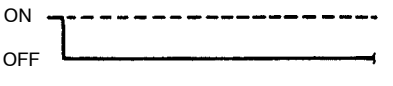

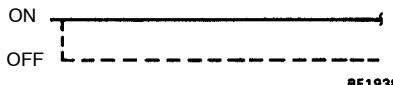
BE3035

## DIAGNOSIS SYSTEM

### OUTPUT OF DIAGNOSTIC CODE READ DIAGNOSTIC CODE

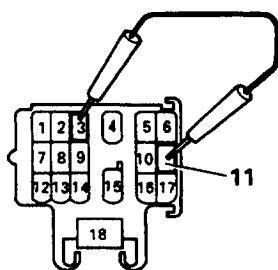
#### Type A

- (a) Turn the ignition switch on.
- (b) Push the SET/ COAST switch on, and keep it on.
- (c) Push the main switch on.
- (d) Check that the indicator light "CRUISE" light-on in the combination meter and after 3 seconds check that the indicator light "CRUISE" blinks.
- (e) Turn the SET/ COAST switch off.
- (f) Meet the conditions listed below.
- (g) Read the diagnostic trouble code on the indicator light "CRUISE".

No.	Conditions	Indication code	Diagnosis
1	Push the cruise control switch SET/COAST on.	ON  OFF	SET/COAST circuit is normal.
2	Push the cruise control switch RESUME/ACCEL on.	ON  OFF	RESUME/ACCEL circuit is normal.
3	Vacuum switch is turned ON.	ON  OFF	Vacuum switch circuit is normal.
4	Each cancel switch turned ON. • Cruise control switch (to CANCEL) • Stop light switch • Park/Neutral Position switch (to N or P Position) • Clutch switch • Parking brake switch	ON  OFF	Each cancel switch is normal.
5	Drive approx. 40 km/h (25 mph) or over.	ON  OFF	Speed sensor circuit is normal.
6	Drive approx. 40 km/h (25 mph) or below.	ON  OFF	Speed sensor circuit is normal.

#### HINT:

- Indication codes appear in order from No.1.
- If there is no indication code, perform diagnosis and inspection. (See page [BE-88](#))
- Indication is stopped, when the MAIN switch is repushed.

**Diagnosis Data Link Connector**

BE2026

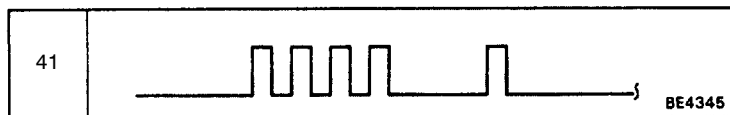
Z08052

**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 cruise control switch circuit the cruise control indicator light "CRUISE" will blink 5 times.
- (b) While stopping, connect terminals 3 and 11 of the Data Link Connector 1.  
HINT: Should the ignition switch turned off, the diagnostic trouble code will be erased from the ECU memory.
- (c) Read the diagnostic trouble code on the indicator light "CRUISE".

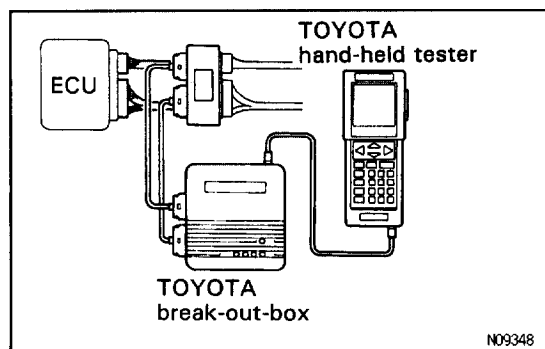
Indication code		Diagnosis
	 BE1939	Normal
11	 BE1940	Control valve circuit of actuator is abnormal.
12	 BE2711	Release valve circuit of actuator is abnormal.
21	 BE1941	Speed sensor circuit is abnormal.
23	 BE1943	*Vehicle speed has decreased by 16 km/h (10 mph) or more from the set speed.
32	 BE1945	SET/COAST switch signal and RESUME/ACCEL switch signal stay on simultaneously.
34	 BE4342	Control switch does not turn off before switching.
* If the set speed can be maintained when the speed control switch is again set at SET/COAST, there is no malfunction.		

When 41 code is indicated, replace the cruise control ECU.



**HINT:**

- Indication codes appear in order from No.11.
- If there is no indication code, perform diagnosis and inspection. (See page [BE-88](#)).



## ECU TERMINAL VALUES MEASUREMENT USING TOYOTA BREAK-OUT-BOX AND TOYOTA HAND-HELD TESTER

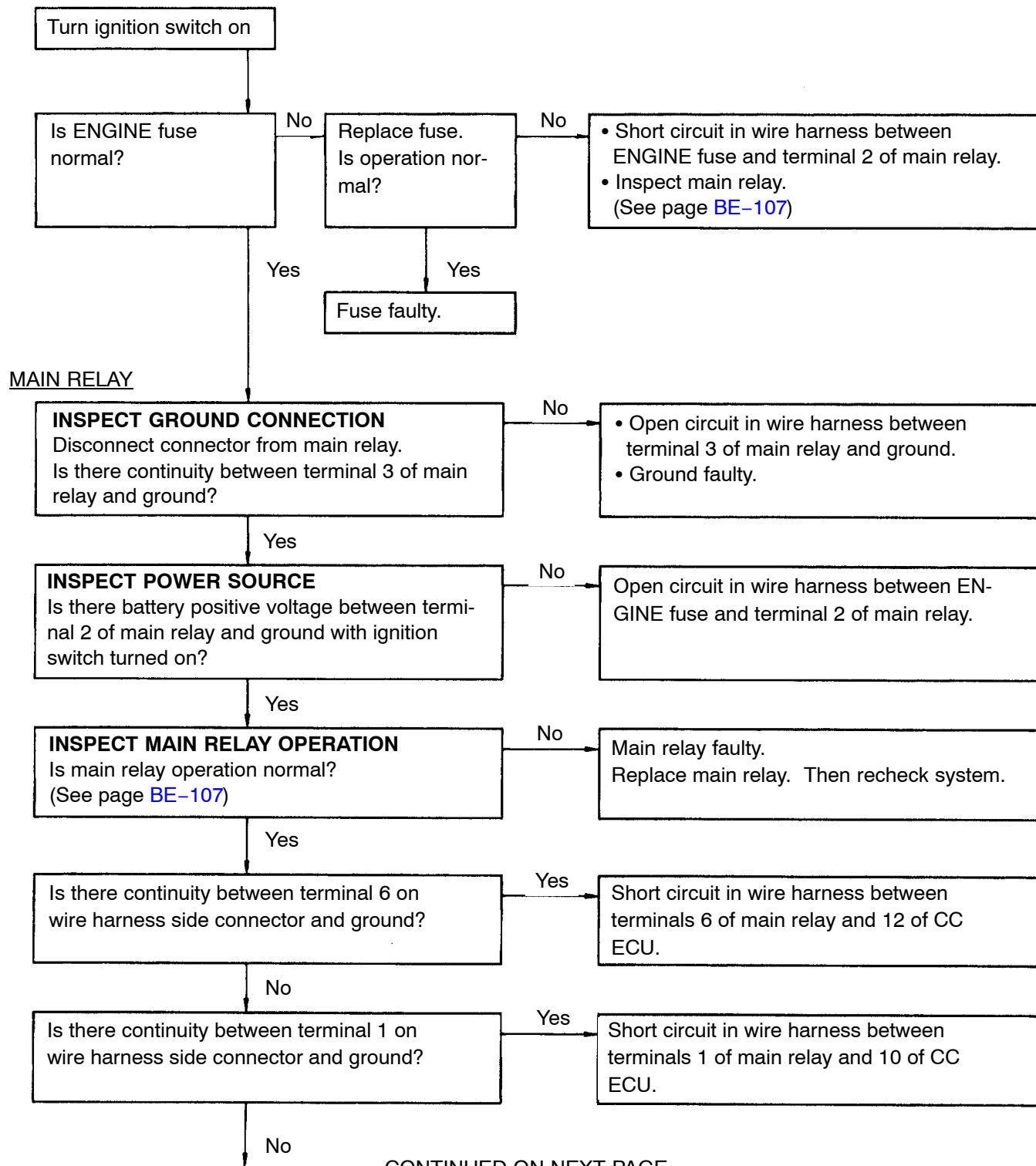
1. Hook up the TOYOTA break-out-box and TOYOTA hand-held tester to the vehicle.
2. Read the ECU input/output values by following the prompts on the hand-held tester screen.

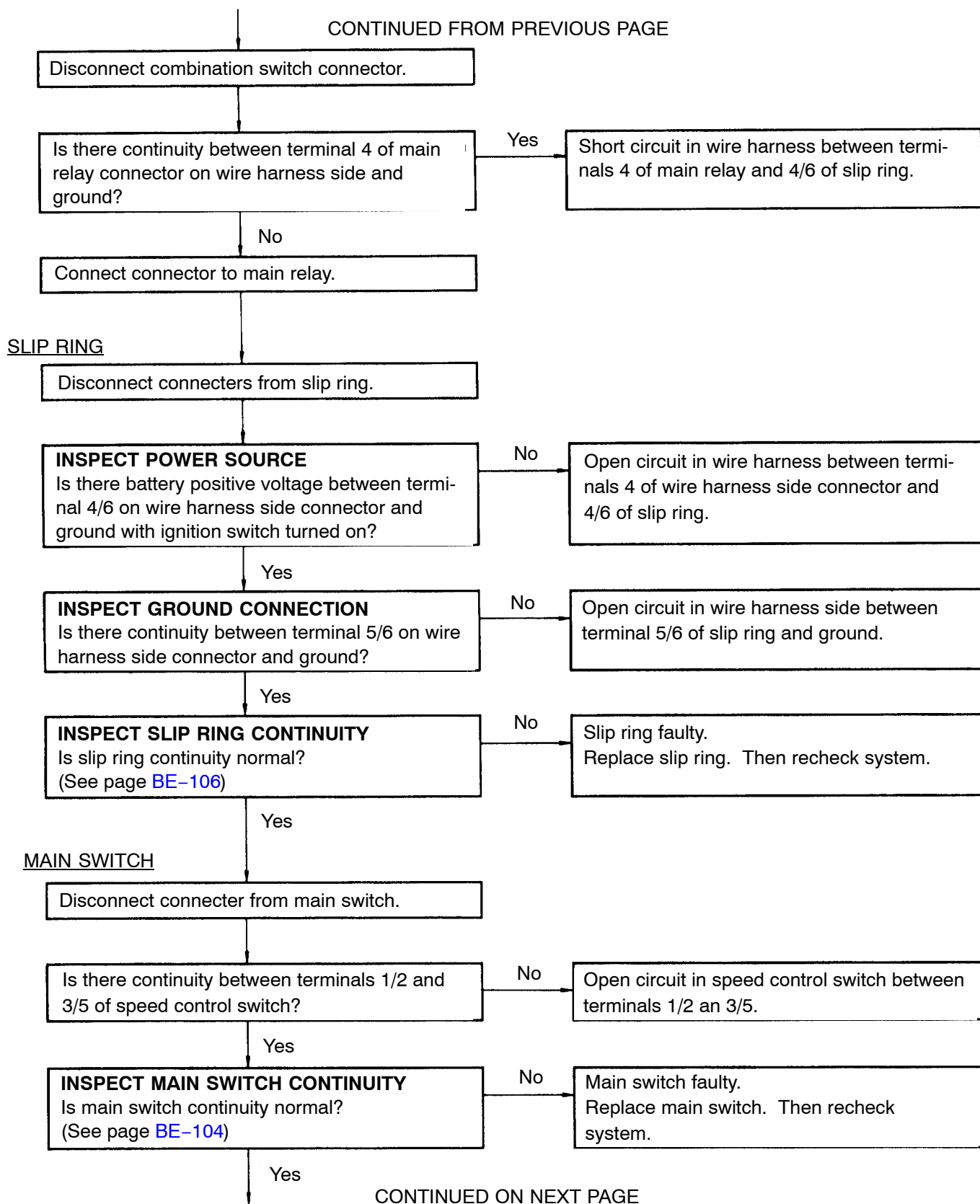
**HINT:** TOYOTA hand-held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems. Please refer to the TOYOTA hand-held tester / TOYOTA break-out-box operator's manual for further details.

## TROUBLESHOOTING

You will find the troubles easier using the table well shown below. In this table, each number shows the priority of causes in troubles. Check each part in order.

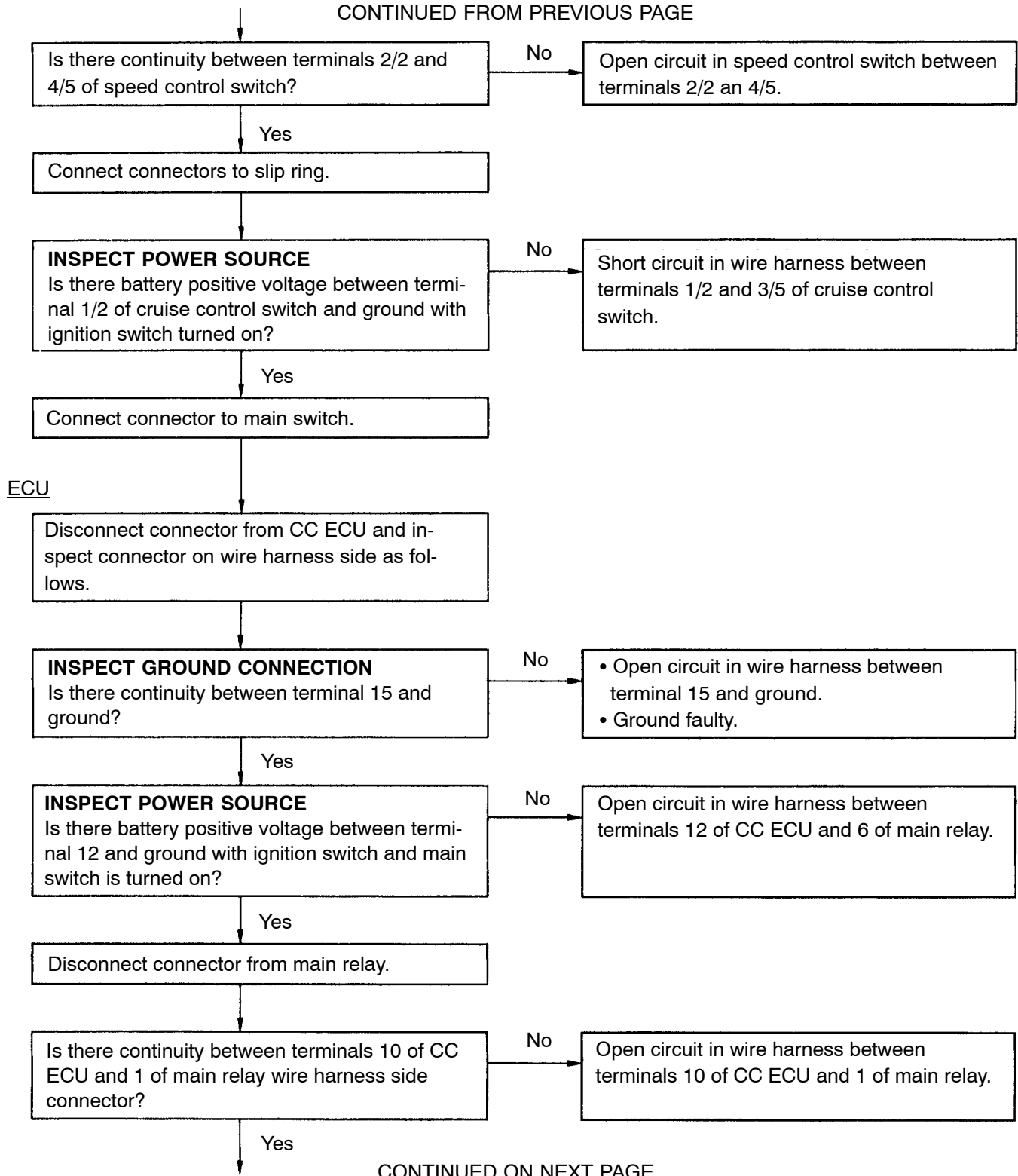
Chart No.					C	A	B	E	G, H	F	I	I	D		
Inspection Item					Actuator	Main switch	Control Switch	Stop Light Switch	Clutch Switch or Park/ Neutral Position Switch	Parking Brake Switch	Vacuum Switch	Vacuum Pump	Vehicle Speed Sensor or Speedometer Cable	Speedometer Cable Function	Others
Diagnosis Trouble Code		Type B	Type A	ECU											
Problem		Type B	Type A												
• "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			6	2						5	4	3	1	*2
	32			2			1								
	Normal	5	OK	8	7	1	2	3	4	5				6	*3
		NG	2										1		
Setting speed deviated on high or low side.		3	OK	6	5						4	3	2	1	
			NG								1				
Vehicle speed fluctuates when speed control switch turned to SET.				4	3								1	2	
Setting speed does not cancel when brake pedal depressed.		4	OK	3	1			2							
			NG	2				1							
Setting speed does not cancel when parking brake lever pulled.		4	OK	2	1										
			NG	2						1					
Setting speed does not cancel when shifted to "N" position (A/T).		4	OK	2	1										
			NG	2					1						
Setting speed does not cancel when clutch pedal depressed (M/T).		4	OK	2	1										
			NG	2					1						
Vehicle speed does not decrease when cruise control switch turned to COAST.		1	OK	3	1									2	
			NG	2			1								
Vehicle speed does not accelerate when cruise control switch turned to ACCEL.		2	OK	3	1									2	
			NG	2			1								
Vehicle speed does not return to memorized speed when control switch turned on RESUME.		2	OK	3	1									2	
			NG	2			1								
Setting speed does not cancel when cruise control switch turned to CANCEL.		4	OK	2	1										
			NG	2			1								
Speed can be set below about 40 km/h (25 mph)		5	OK	2	1									1	
			NG	2											
Cruise control will not disengage even at about 40 km/h (25 mph).		5	OK	2	1									1	2
			NG	3											
Acceleration response is sluggish when cruise control switch turned to "ACCEL" or "RESUME"		3	OK	4	3							2		1	*2
			NG								1	2			
*1 : in the Speedometer      *2 : Vacuum Hose      *3 : Vacuum Hose & Brake Fluid															

**A INSPECTION OF POWER SOURCE CIRCUIT**



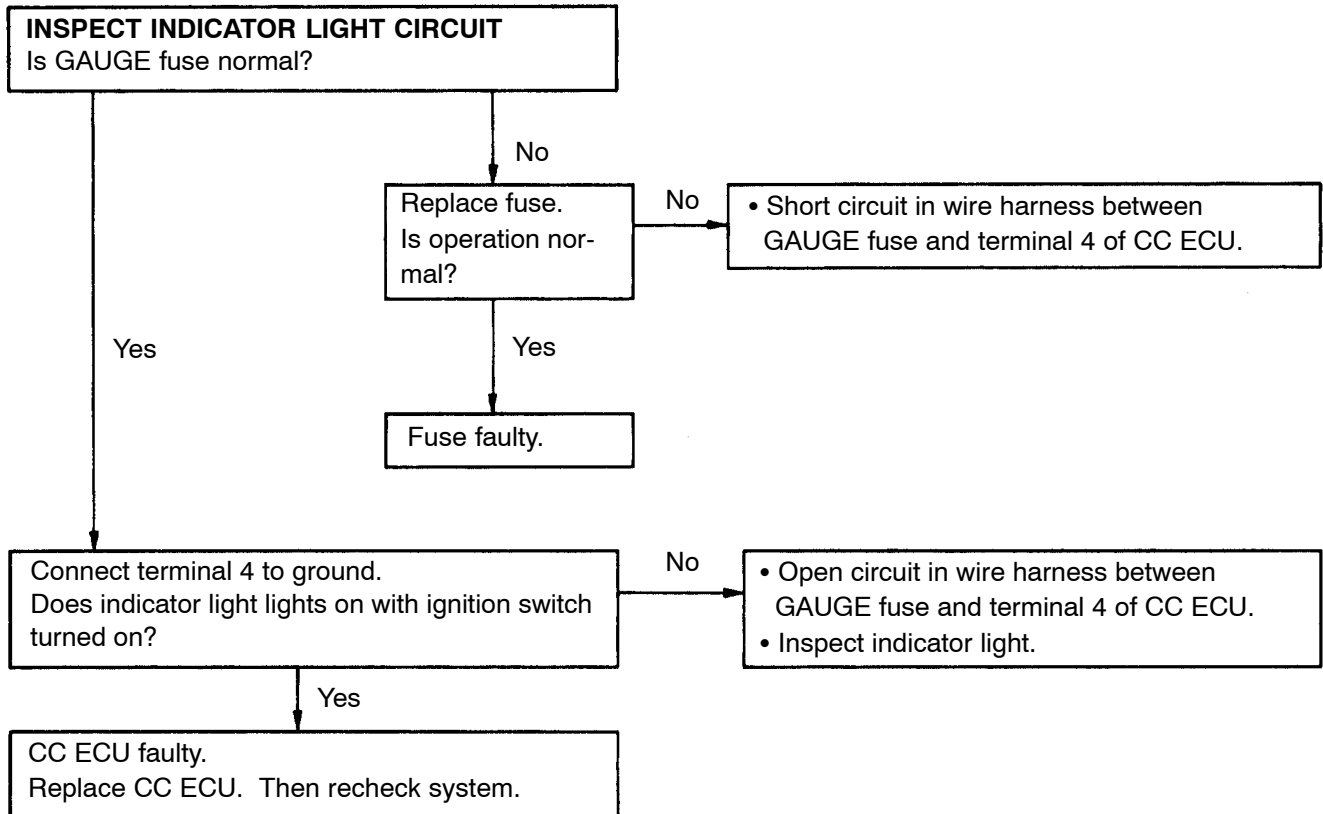


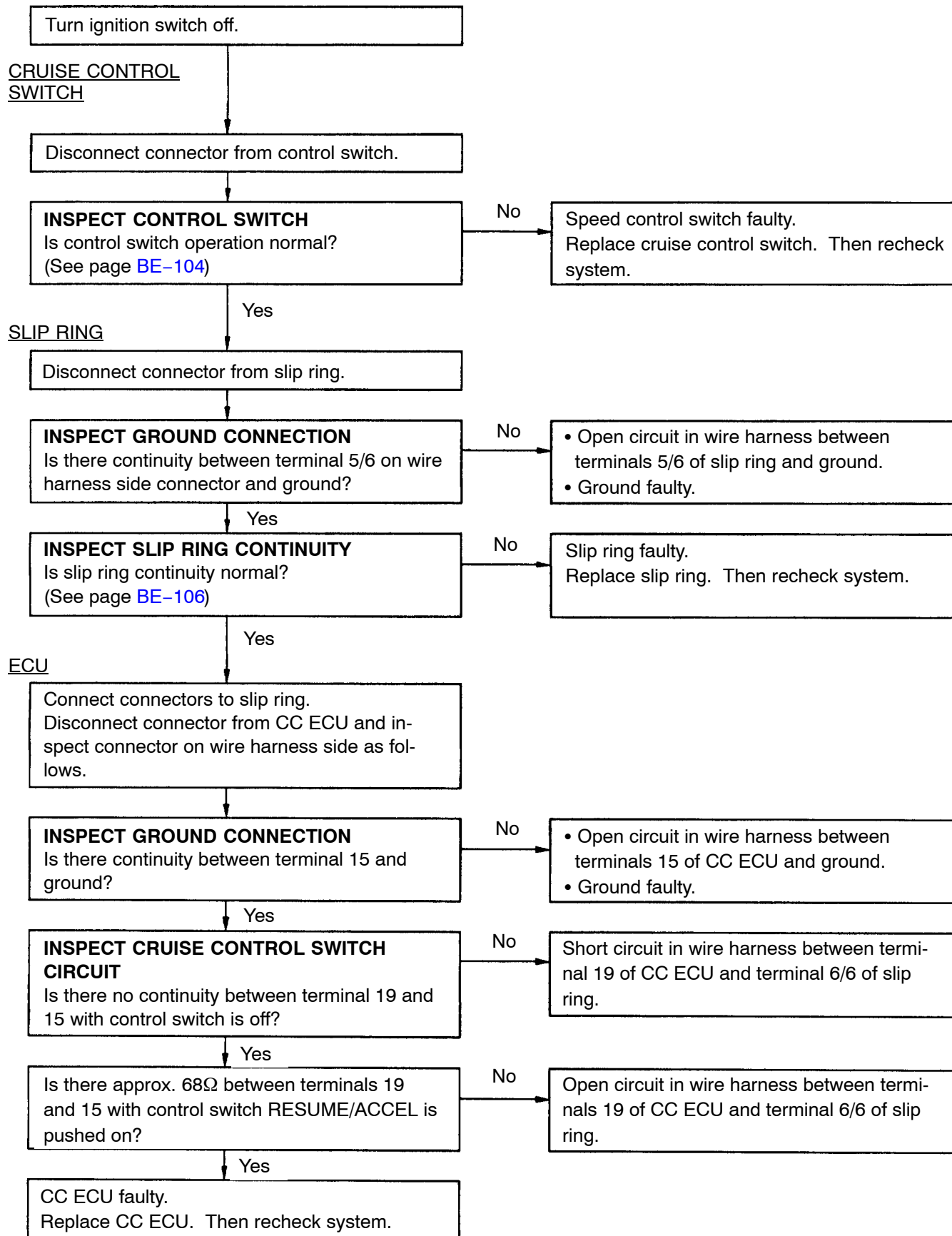
CONTINUED FROM PREVIOUS PAGE



CONTINUED ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE



**B INSPECTION OF CRUISE CONTROL SWITCH CIRCUIT**

**C INSPECTION OF ACTUATOR CIRCUIT**

Turn ignition switch off.

VACUUM HOSE

Are there cracks or other damage on the vacuum hose?

Yes

Vacuum hose faulty.  
Replace vacuum hose. Then recheck system.

No

ACTUATOR**INSPECT CABLE FREEPLAY**

Is control cable freeplay less than 10 mm (0.39 in.)?

No

Adjust control cable freeplay.

Yes

**INSPECT ACTUATOR GROUND**

Disconnect connector from actuator.  
Is actuator operation normal?  
(See page [BE-108](#))

No

Actuator faulty.  
Replace actuator. Then recheck system.

Yes

Is there continuity between terminal 3 on wire harness side connector and ground?

No

Open circuit in wire harness between terminal 3 of actuator and terminal 16 of ECU.

Yes

STOP LIGHT SWITCH**INSPECT STOP LIGHT SWITCH CIRCUIT**

Disconnect connector from stop light switch.  
Is there continuity between terminal 4 of wire harness side connector and ground?

Yes

Short circuit in wire harness between terminal 1 of actuator and terminal 4 of stop light switch.

No

Connect the connector to actuator.  
Is there continuity between terminal 4 of wire harness side connector and ground?

No

Open circuit in wire harness between terminal 1 of actuator and terminal 4 of stop light switch.

Yes (There is resistance approx. 71Ω)

**INSPECT STOP LIGHT SWITCH CONTINUITY**

Is stop light switch continuity normal?  
(See page [BE-106](#))

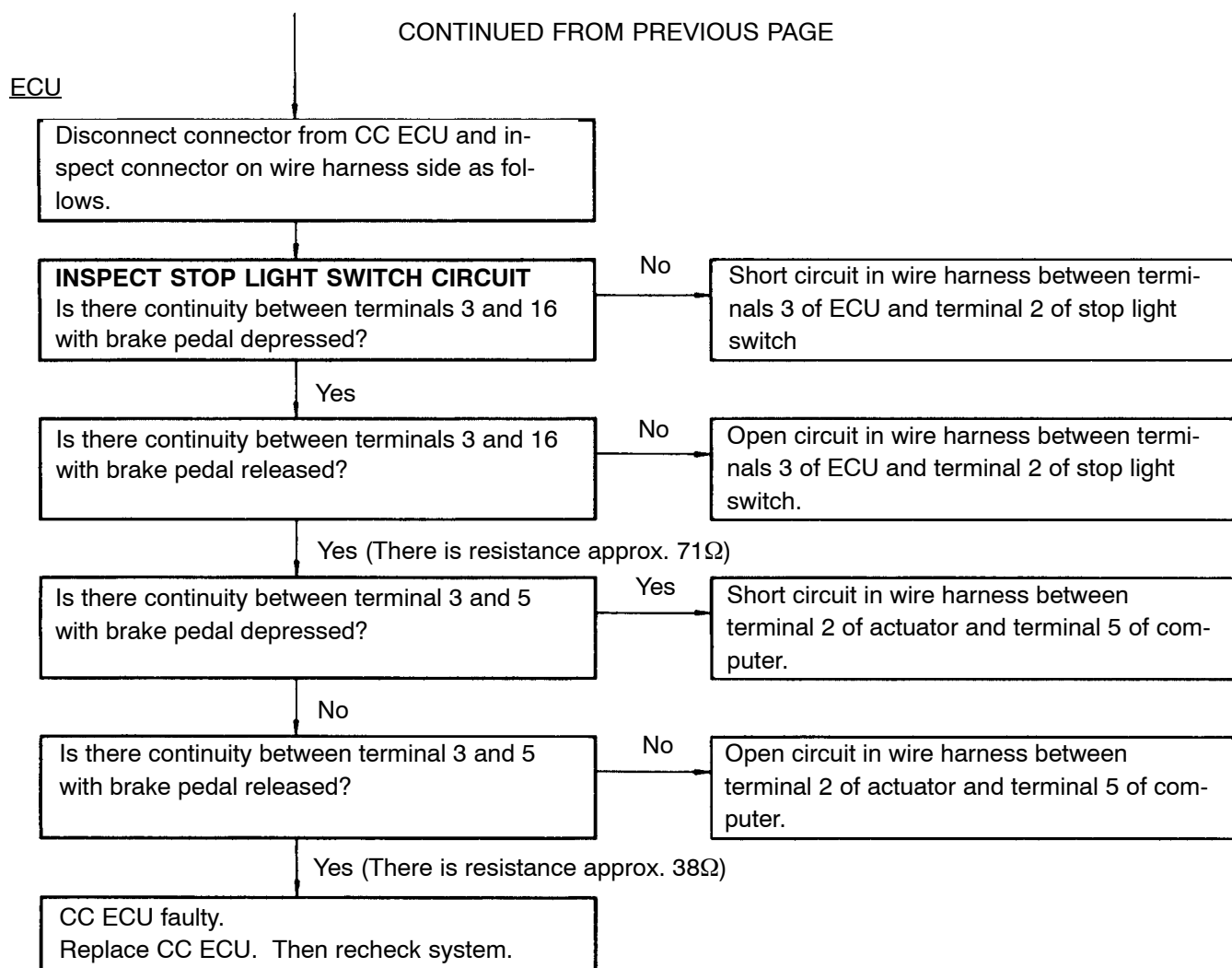
No

Replace stop light switch. Then recheck system.

Yes

Connect connector to stop light switch.

CONTINUED ON NEXT PAGE



**D INSPECTION OF SPEED SENSOR CIRCUIT**CRUISE CONTROL  
SWITCH**INSPECT SPEED METER CABLE**

Does not meter fluctuate when driving at a steady speed?

Yes

Meter cable faulty.

Replace meter cable. Then recheck system.

No

Turn ignition switch off.

SPEED SENSOR

Disconnect connector from combination meter.

**INSPECT GROUND CONNECTION**

Is there continuity between terminal B on wire harness side connector and ground?

No

- Open circuit in wire harness between terminals B of combination meter and ground.
- Ground faulty.

Yes

**INSPECT SPEED SENSOR OPERATION**

Is there sensor operation normal?  
(See page [BE-51](#))

No

Speed sensor faulty.

Replace speed sensor. Then recheck system.

Yes

Connect connectors to combination meter.

ECU

Disconnect connector from CC ECU and inspect connector on wire harness side as follows.  
Turn ignition switch on.

**INSPECT SPEED SENSOR CIRCUIT**

Does the voltage between terminal 8 and ground change repeatedly 0 V to approx. 5 V or more when speedometer shaft is turned?

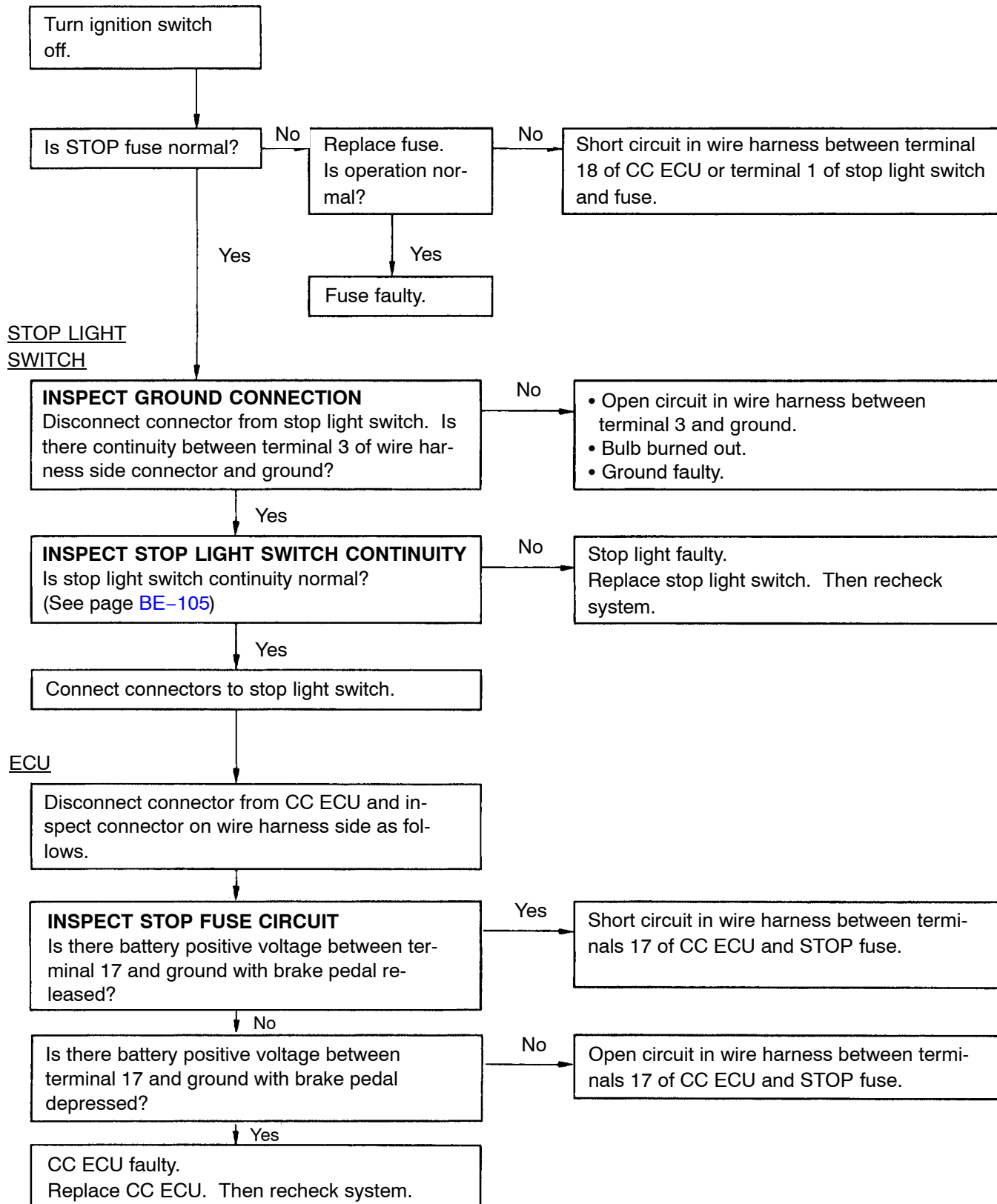
No

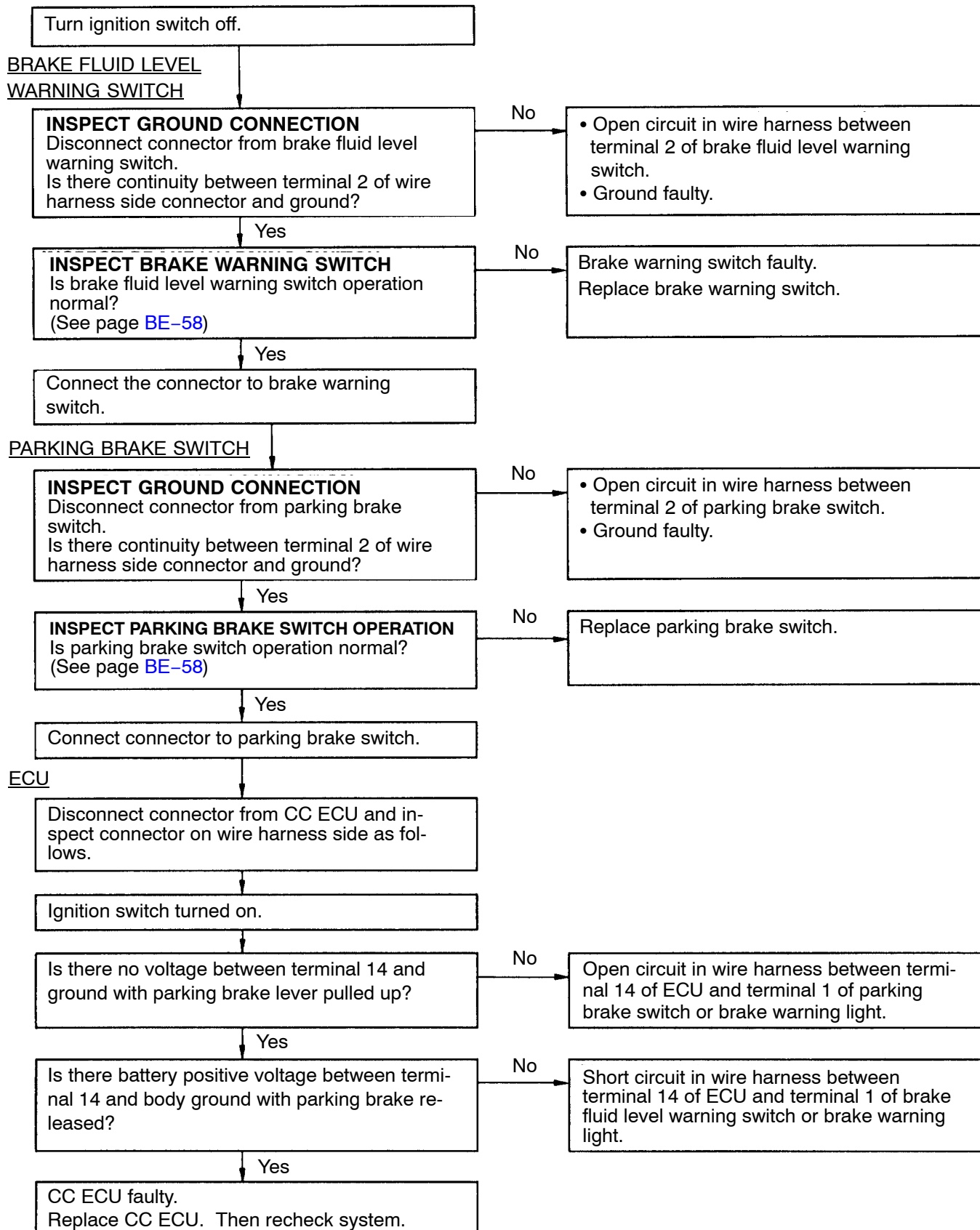
Open or short circuit in wire harness between terminals 8 of CC ECU and terminal A of combination meter.

Yes

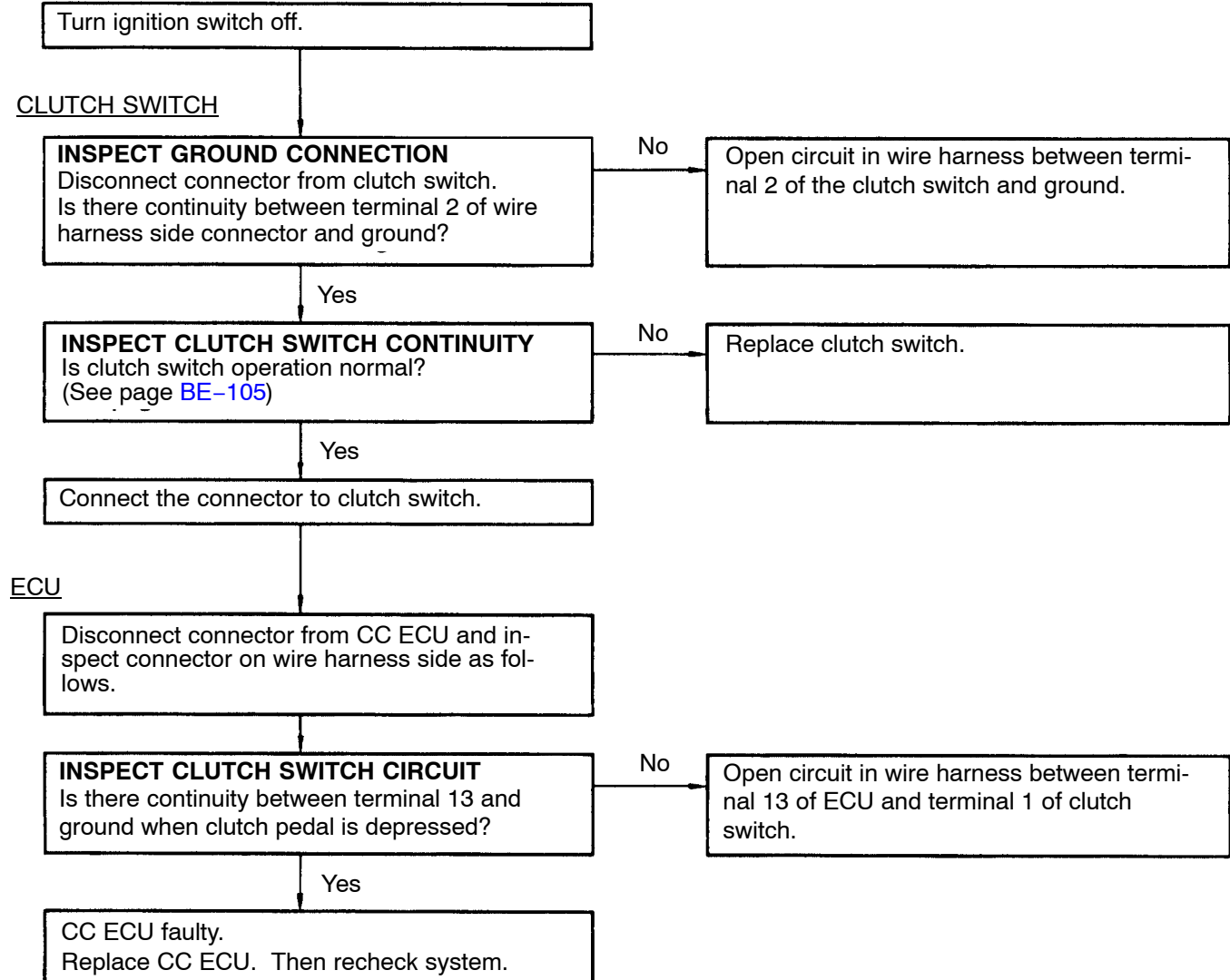
CC ECU faulty.

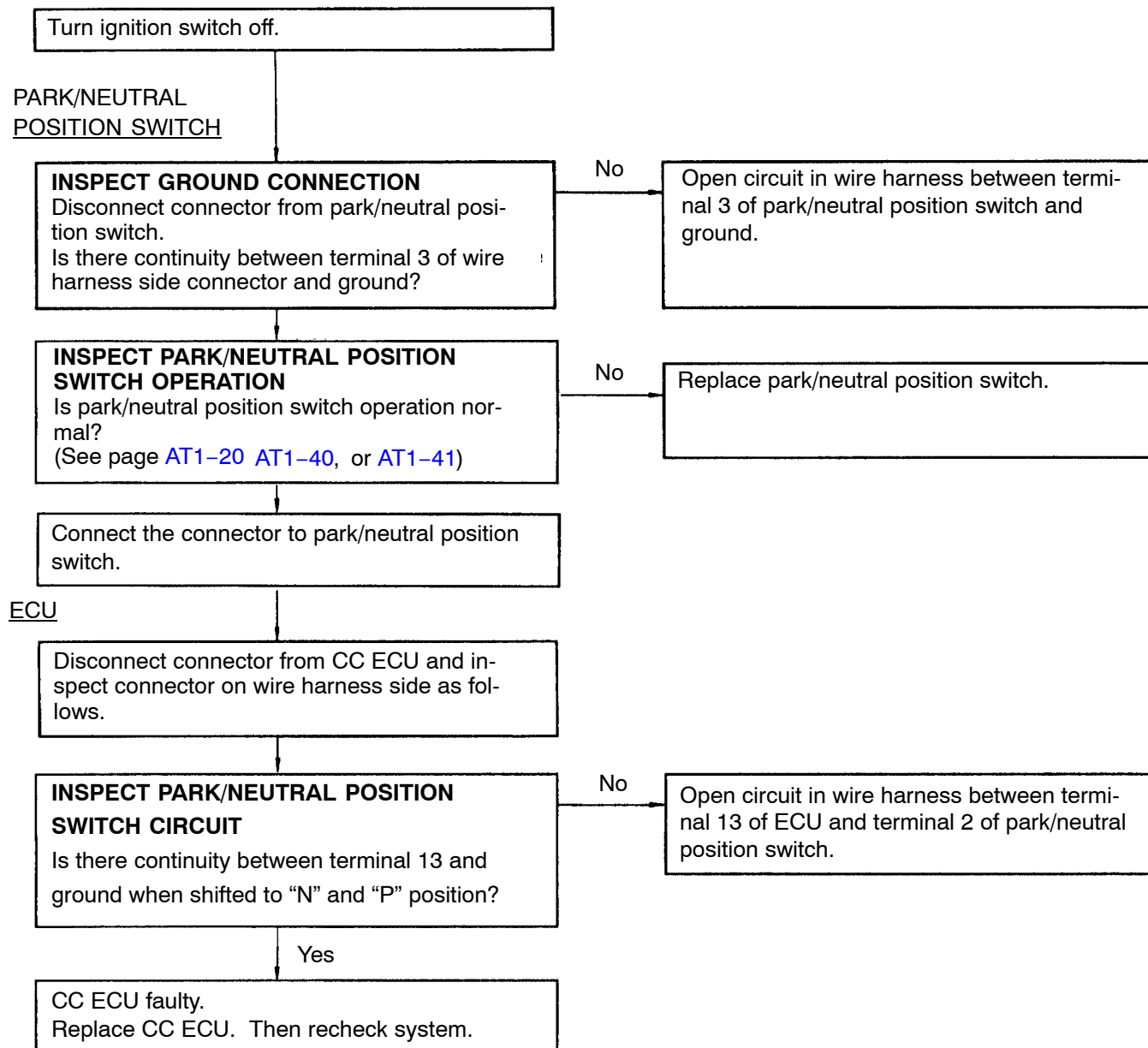
Replace CC ECU. Then recheck system.

**E INSPECTION OF STOP LIGHT SWITCH CIRCUIT**

**F INSPECTION OF PARKING BRAKE SWITCH CIRCUIT**



**G INSPECTION OF CLUTCH SWITCH CIRCUIT**

**H INSPECTION OF PARK/NEUTRAL POSITION SWITCH CIRCUIT**

**I INSPECTION OF VACUUM CIRCUIT**

Turn ignition switch off.

**VACUUM HOSE**

Are there cracks or other damage on the vacuum hose?

Yes

Replace vacuum hose.

No

**VACUUM SWITCH****INSPECT VACUUM SWITCH CIRCUIT**

Disconnect connector from vacuum switch.  
Is there continuity between terminal 2 of vacuum switch and ground?

No

- Open circuit in wire harness between terminal 2 of vacuum switch and ground.
- Ground faulty.

Yes

**INSPECT SWITCH OPERATION**

Is vacuum switch normal?  
(See page [BE-107](#))

No

Replace vacuum switch.

Yes

**VACUUM PUMP****INSPECT GROUND CONNECTION**

Disconnect connector from vacuum pump.  
Is there continuity between terminal 2 of vacuum harness side connector and ground?

No

- Open circuit in wire harness between terminal 2 of vacuum pump and ground.
- Ground faulty.

Yes

**INSPECT VACUUM PUMP OPERATION**

Is vacuum pump operation normal?  
(See page [BE-107](#))

No

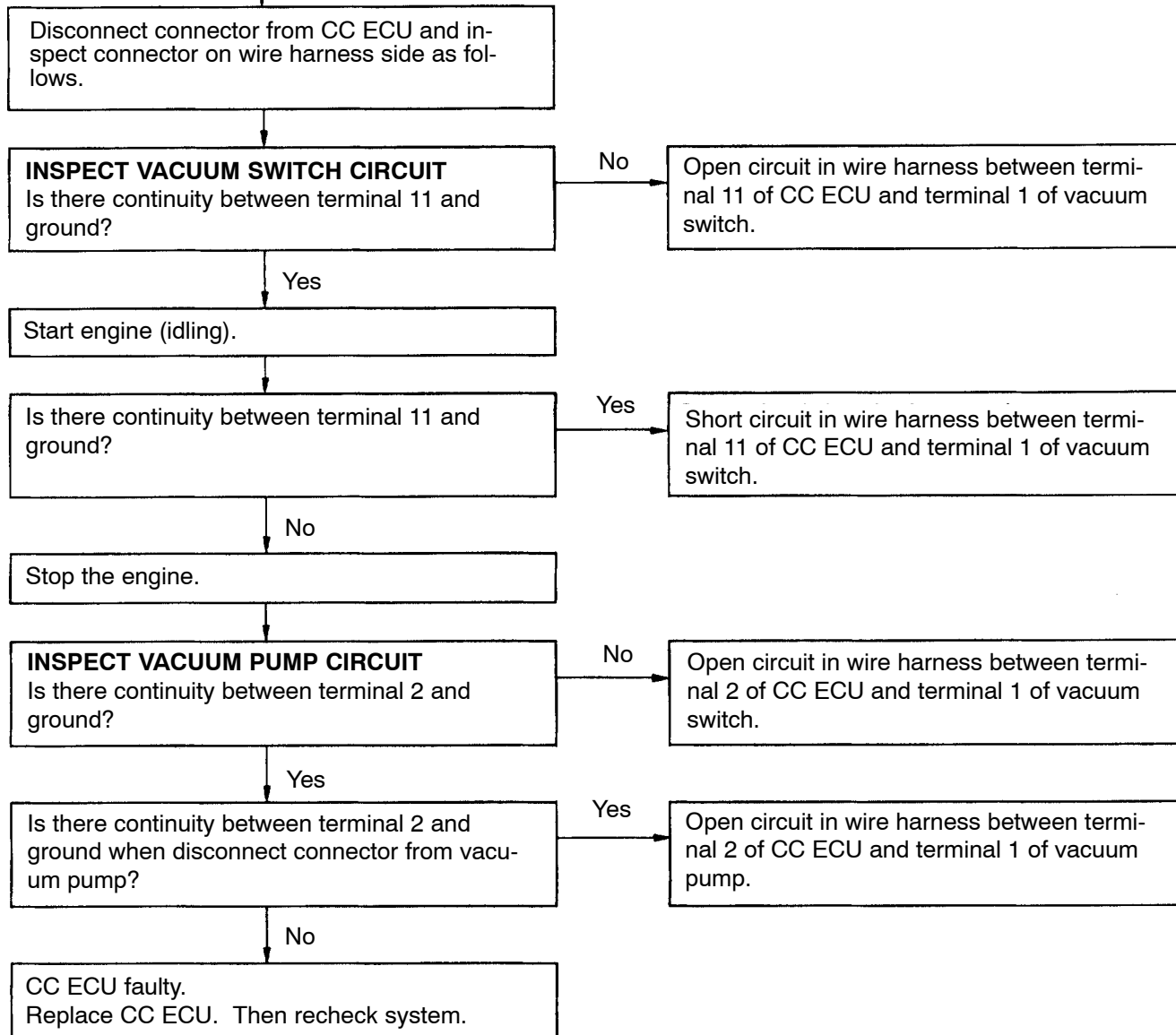
Replace vacuum pump.

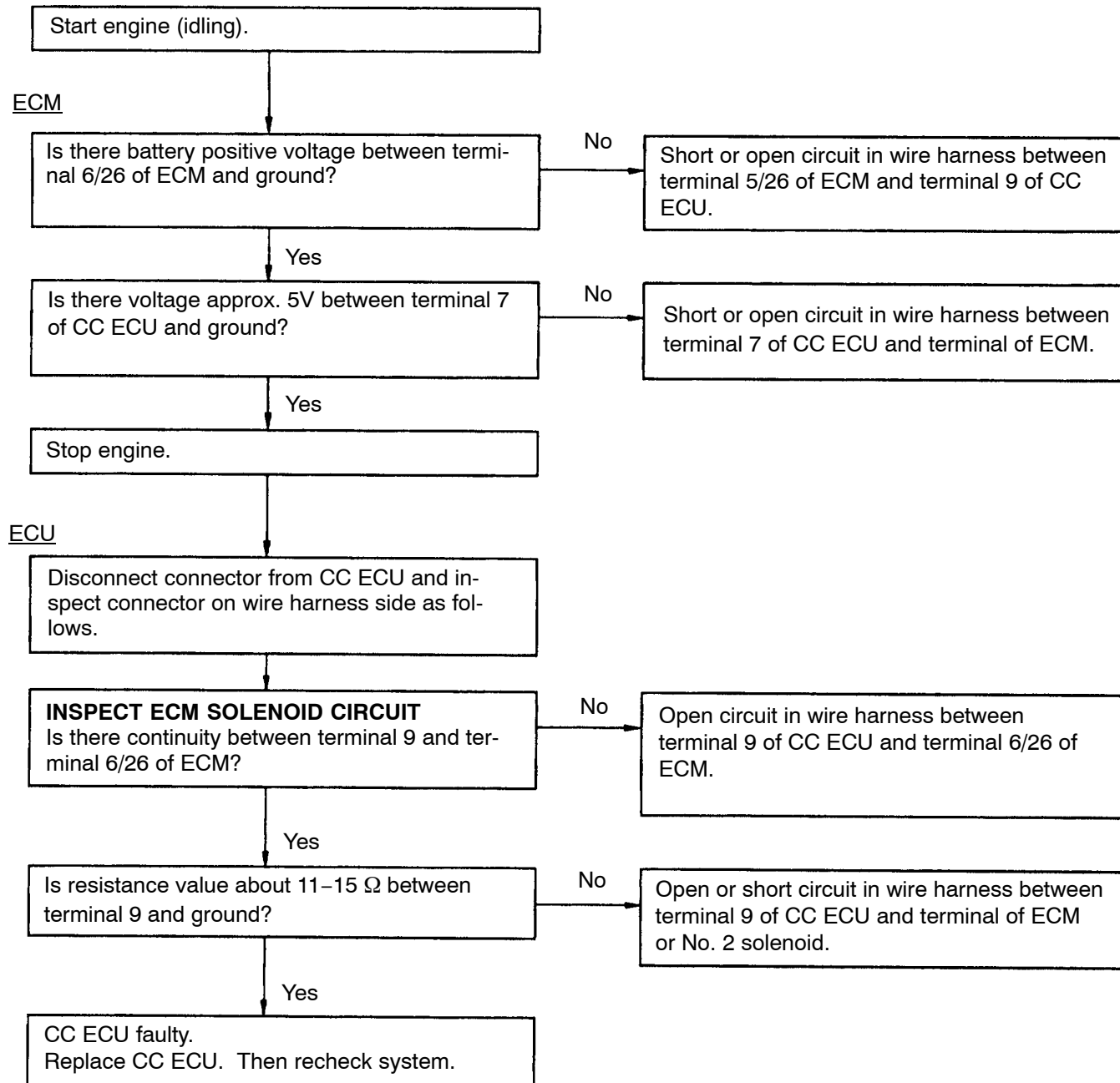
Yes

Connect the connector to vacuum switch and pump.

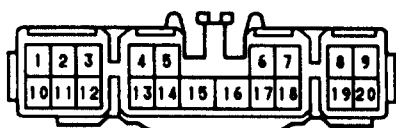
CONTINUED ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

ECU

**J INSPECTION OF ECM SOLENOID CIRCUIT**

## Wire Harness Side



e-20-1

Z08669

## CRUISE CONTROL ECU INSPECTION

## INSPECT ECU

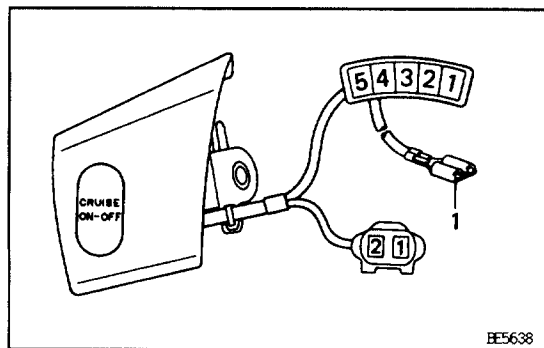
## Circuit

Disconnect the connector from the ECU and inspect the connector on the wire harness side, as shown below.

Connection or Measure item	Check for	Tester Connection	Condition		Specified valve
Data Link Connector 2	Continuity	1 – Ground	Short terminals between “T <sub>C</sub> ” and “E <sub>1</sub> ”		Continuity
			Released		No continuity
Vacuum pump		2 – Ground	Constant		Continuity *1
Vehicle speed sensor (in combination meter)		8 – Ground	Vehicle moving slowly		1 pulse each 40 cm approx. (15.75in.)
Vacuum switch		11 – Ground	Vacuum	No vacuum	Continuity
				More than 70 ± 30 mmHg 6.69 ± 1.18 in.Hg 22.6 ± 64.0 kPa	No continuity
Park/Neutral Position switch		13 – Ground	Shift position	“N” or “P” position	Continuity
				“L”, “2”, “D” or “R” position	No continuity
Clutch switch (M/T)		13 – Ground	Clutch pedal position	Depressed	Continuity
				Released	No continuity
Parking brake switch		14 – Ground	Parking brake lever position	Pulled	Continuity
				Released	No continuity
Body ground		15 – Ground	Constant		Continuity
Stop light switch		17 – 18	Brake pedal position	Depressed	Continuity *1
				Released	No continuity
CANCEL switch	Resistance	19 – Ground	Cruise control switch position	CANCEL switch is pushed	Approx. 418Ω
		Released		No continuity	
RESUME/ACCEL switch		19 – Ground		RESUME/ACCEL switch is pushed	Approx. 68Ω
		Released		No continuity	
SET/COAST switch		19 – Ground		SET/COAST switch is pushed	Approx. 198Ω
				Released	No continuity
Stop light switch and actuator (release valve)		3 – 16	Brake pedal position	Depressed	No continuity
				Released	Approx. 71Ω
Actuator (control valve)		5 – 16	Constant		Approx. 38Ω
No. 2 solenoid valve	9 – Ground	Constant		less than 15Ω	
GAUGE fuse and indicator light	Voltage	4 – Ground	Ignition switch position	ON	Battery positive voltage
			LOCK, ACC	No voltage	
ENGINE fuse		6 – Ground	Ignition switch position	ON	Battery positive voltage
				LOCK, ACC	No voltage
O/D circuit		7 – Ground	Ignition SW position	ON	Approx. 5 V or more
				LOCK, ACC	No voltage
ENGINE fuse, main switch and main relay		10 – Ground	Ignition switch ON and MAIN switch position	ON	less than 0.3 V
				OFF	No voltage
		12 – Ground	Ignition switch ON and MAIN switch position	ON	Battery positive voltage
				OFF	No voltage

\*1 There is resistance in the circuit.

If circuit is as specified, replace the ECU.



BE5638

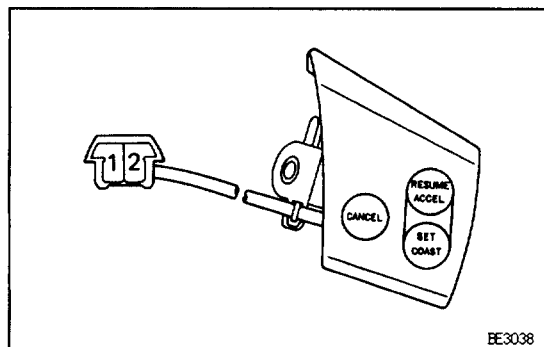
## MAIN SWITCH INSPECTION

### INSPECT MAIN SWITCH

#### Continuity

Condition	Tester connection to terminal number	Specified value
Constant	4/5 – 2/2	Continuity
Constant	2/5 – 1/2	Continuity
Constant	1/5 – 1/1	Continuity
ON	4/5 – 1/2	Continuity

If continuity is not as specified, replace the switch.



BE3038

## CRUISE CONTROL SWITCH INSPECTION

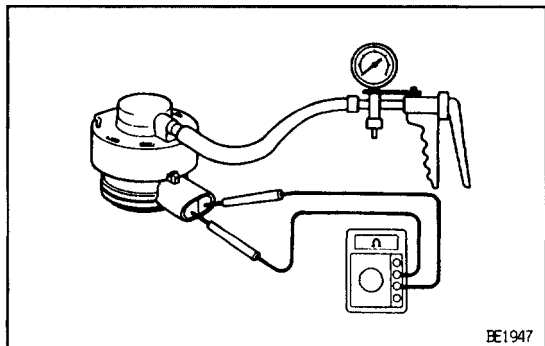
### INSPECT CRUISE CONTROL SWITCH

#### Resistance

Measure the resistance value between terminals 1 and 2.

Switch position	Resistance ( $\Omega$ )
OFF	No continuity
RESUME/ACCEL	Approx. 68
SET/COAST	Approx. 198
CANCEL	Approx. 418

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



BE1947

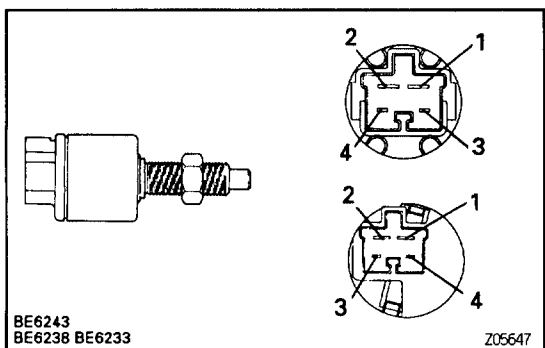
## VACUUM SWITCH INSPECTION

### INSPECT VACUUM SWITCH

#### Operation

- Check that there is continuity between terminals with no vacuum.
- Check that there is no continuity between terminals with a vacuum of  $22.66 \pm 4.00$  kPa ( $170 \pm 30$  mmHg.  $6.69 \pm 1.18$  in.Hg) or above.

If operation is not as specified, replace the switch.

BE6243  
BE6238 BE6233

Z05647

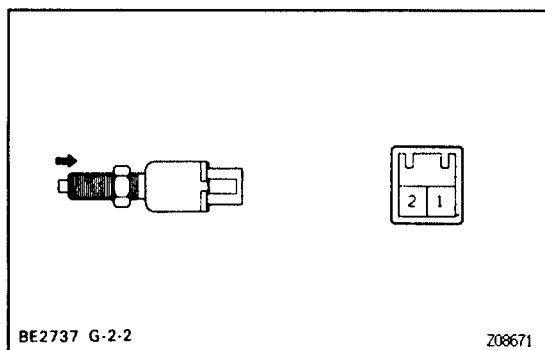
## STOP LIGHT SWITCH INSPECTION

### INSPECT STOP LIGHT SWITCH

#### Continuity

Switch Position	Tester connection to terminal number	Specified value
Switch pin free (Brake pedal depressed)	1 – 3	Continuity
Switch pin pushed in (Brake pedal released)	2 – 4	Continuity

If continuity is not as specified, replace the switch.



BE2737 G-2-2

Z08671

## CLUTCH SWITCH INSPECTION

### INSPECT CLUTCH SWITCH

#### Continuity

Switch Position	Tester connection to terminal number	Specified value
Switch pin free (Clutch pedal depressed)	1 – 2	Continuity
Switch pin pushed in (Clutch pedal released)	–	No continuity

If continuity is not as specified, replace the switch.



**BRAKE FLUID LEVEL WARNING  
SWITCH INSPECTION**

INSPECT BRAKE FLUID LEVEL WARNING SWITCH  
(See page [BE-58](#))

**PARKING BRAKE SWITCH INSPECTION**

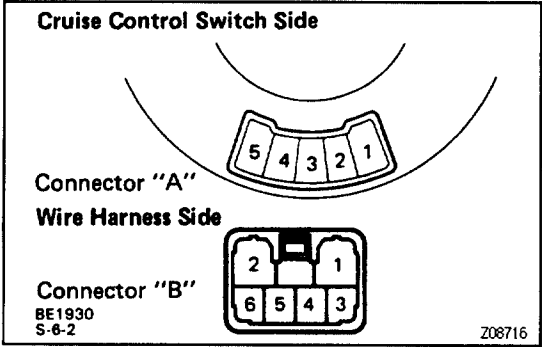
INSPECT PARKING BRAKE SWITCH  
(See page [BE-58](#))

**PARK/ NEUTRAL POSITION SWITCH  
INSPECTION**

INSPECT PARK/ NEUTRAL POSITION SWITCH  
(See pages [AT1-20](#), [AT2-40](#), [AT3-48](#))

**VEHICLE SPEED SENSOR INSPECTION**

INSPECT VEHICLE SPEED SENSOR  
(See page [BE-51](#))

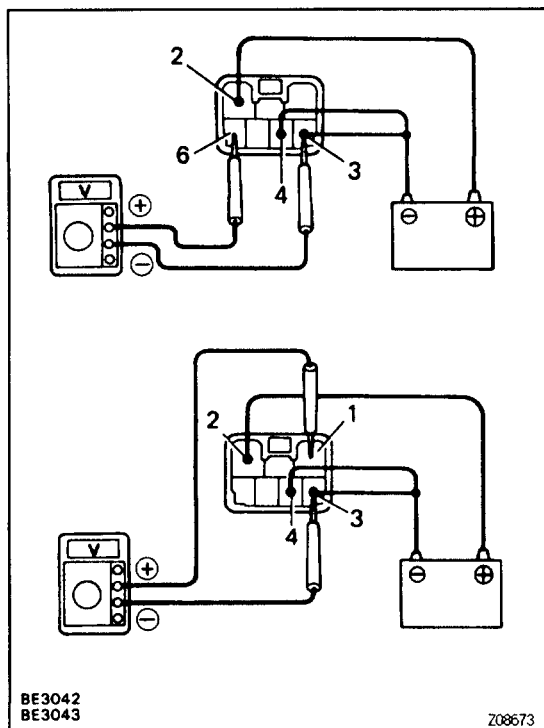


**SLIP RING INSPECTION**

INSPECT SLIP RING  
Continuity

Condition	Tester connection to terminal number	Specified value
Constant	A2 – B6	Continuity
Constant	A3 – B4	Continuity
Constant	A4 – B5	Continuity

If continuity is not as specified, replace the slip ring.

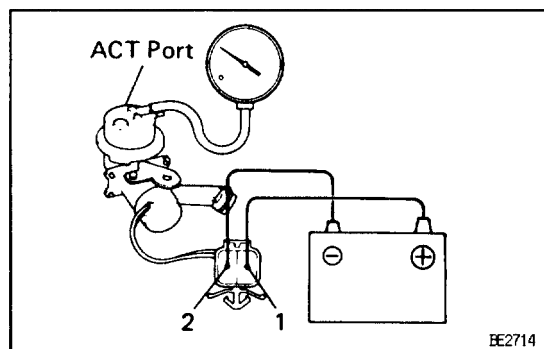


## MAIN RELAY INSPECTION

### INSPECT MAIN RELAY

#### Operation

- Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminals 3 and 4.
  - Connect the positive (+) lead from the voltmeter to terminal 6 and the negative (-) lead to terminal 3, check that there is battery positive voltage.
  - Change the positive (+) lead to terminal 1, check that there is voltage less than 0.3 V.
- If operation is not as specified, replace the relay.



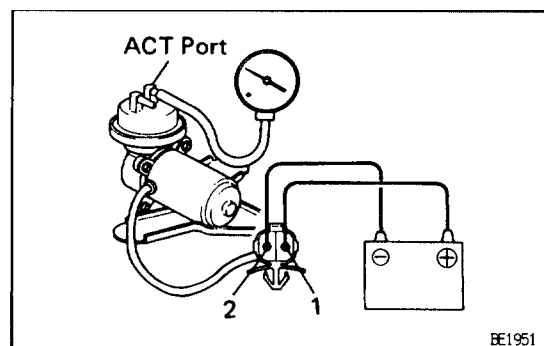
## VACUUM PUMP INSPECTION

### INSPECT VACUUM PUMP

#### 3VZ-E Engine:

- Connect a vacuum gauge to the ACT side of the pump.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2.
- Check that there is a vacuum of 26.7 kPa (200 mmHg, 7.87 in.Hg) or above.

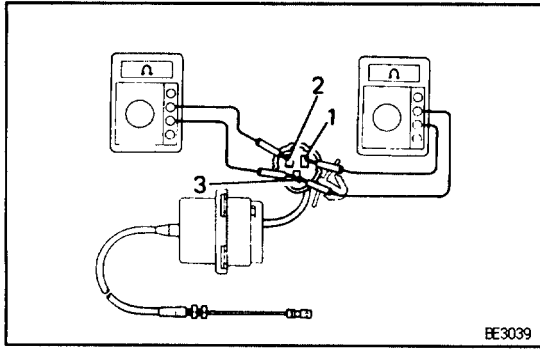
If operation is not as specified, replace the pump.



#### 22R-E Engine:

- Connect a vacuum gauge to the ACT side of the pump.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2.
- Check that there is a vacuum of 26.7 kPa (200 mmHg, 7.87 in.Hg) or above.

If operation is not as specified, replace the pump.



## ACTUATOR INSPECTION

### INSPECT ACTUATOR

#### Resistance

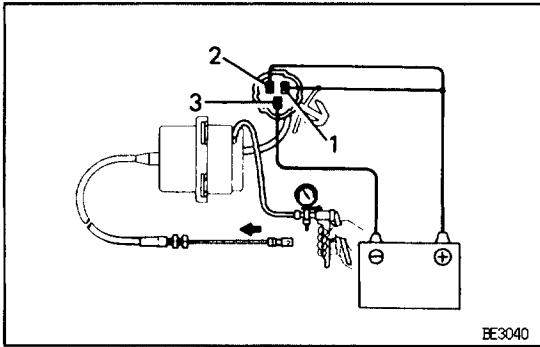
Measure the resistance value between terminals as follows.

#### Resistance:

1 - 3 Approx. 71  $\Omega$

2 - 3 Approx. 38  $\Omega$

If the resistance value is not as specified, replace the actuator.

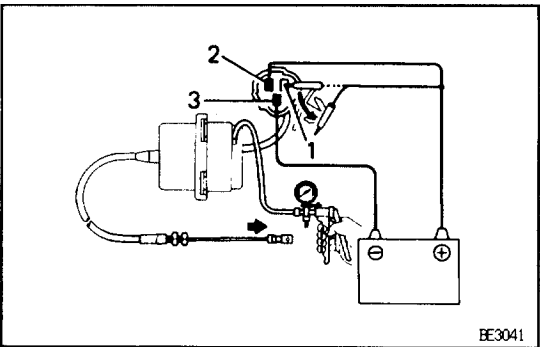


### Operation

- Connect the positive (+) lead from the battery to terminals 1 and 2, and the negative (-) lead to terminal 3.
- Slowly apply vacuum from 0 to 40.0 kPa (0 to 300 mmHg, 0 to 11.81 in.Hg) check that the control cable can be pulled smoothly.

#### Cable stroke:

Approx. 36 mm (1.42 in.)



- With the vacuum stabilized, check that the control cable does not return.
- With the vacuum stabilized, check that the control cable does not return.
- Disconnect terminal 1 or 2 and check that the control cable returns to its original position and the vacuum returns to 0 kPa (0 mmHg, 0 in.Hg).

If operation is not as specified, replace the actuator.