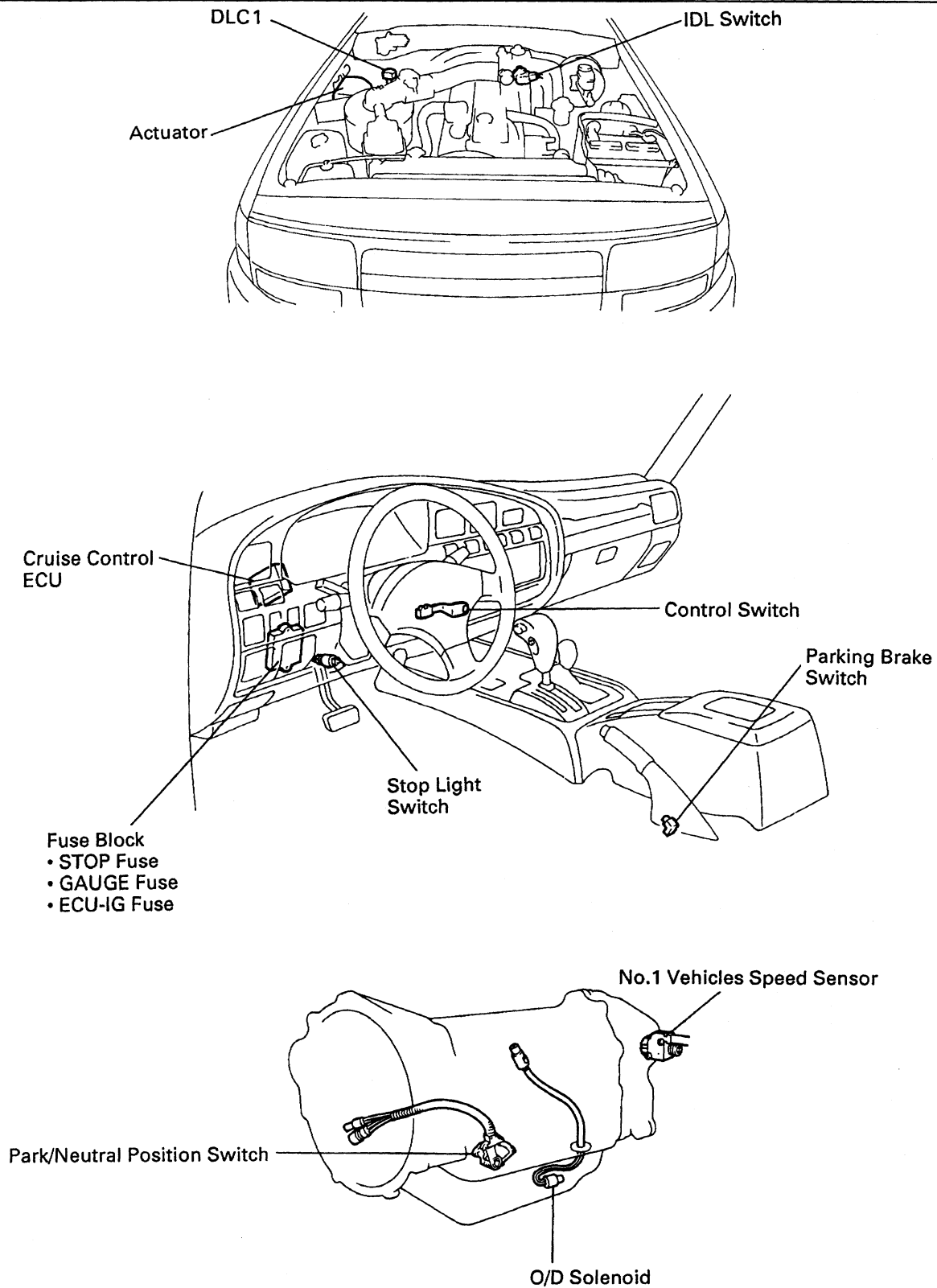
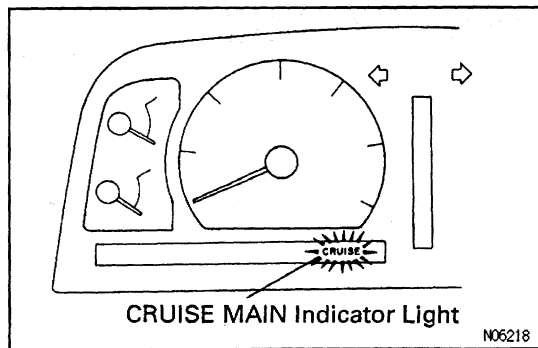


CRUISE CONTROL SYSTEM PARTS LOCATION

BEOKZ-01





DIAGNOSIS SYSTEM

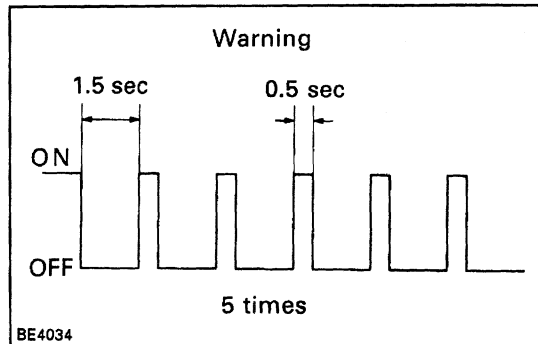
INDICATOR CHECK

1. Turn the ignition switch to ON.
2. Check that the CRUISE MAIN indicator light comes on when the cruise control main switch is turned on, and that the indicator light goes off when the main switch is turned OFF.

HINT: If the indicator check result is not normal, proceed to troubleshooting (See page BE-47) for the combination meter section.

DIAGNOSTIC TROUBLE CODE CHECK

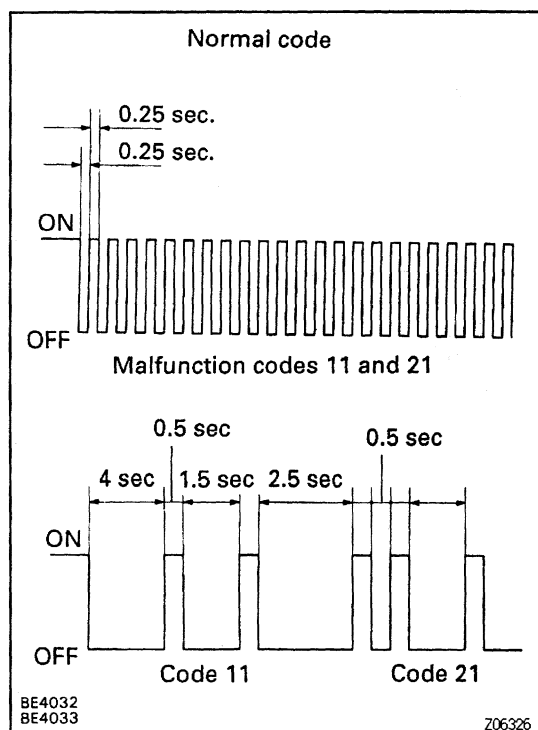
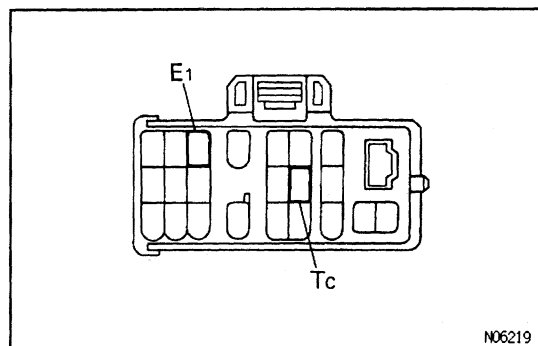
HINT: If a malfunction occurs in the speed sensors or actuator, etc. during cruise control driving, the ECU actuates AUTO CANCEL of the cruise control and blinks the CRUISE MAIN indicator light 5 times to inform the driver of a malfunction. At the same time, the malfunction is stored in memory as a diagnostic trouble code.



OUTPUT OF DIAGNOSTIC TROUBLE CODE

1. Turn the ignition switch ON.
2. Using SST, connect terminal Tc and E, of DLC 1. SST 09843-18020
3. Read the diagnostic trouble code on the CRUISE MAIN indicator light.

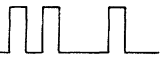
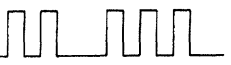
HINT: If the diagnostic trouble code is not output, inspect the Tc circuit.



As an example, the blinking patterns for codes; normal, 1 1 and 21 are shown in the illustration.

4. Check for the problem using the diagnostic trouble code table on the next page.
5. After completing the check, disconnect terminals Tc and E,, and turn off the display.

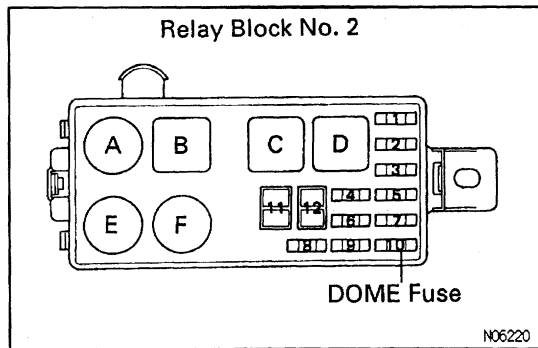
DIAGNOSTIC TROUBLE CODE

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

V04380

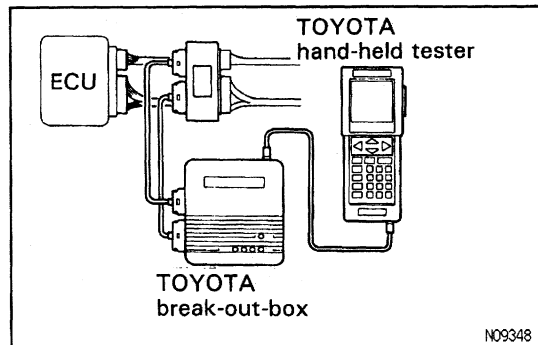
HINT: When 2 or more codes are indicated, the lowest numbered code will be displayed first.

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



DIAGNOSTIC TROUBLE CODE CLEARANCE

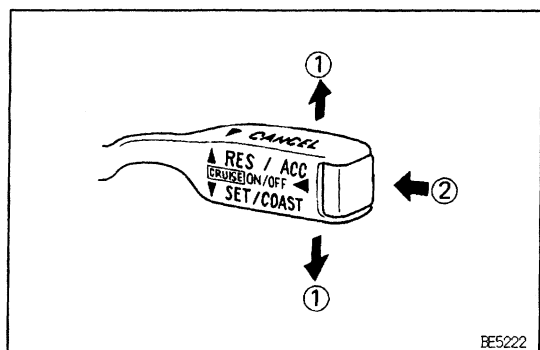
1. After completing repairs the diagnostic code retained in memory can be cleared by removing the DOME fuse for 10 seconds or more, with the ignition switch off.
2. Check that the normal code is displayed after connecting the fuse.



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

1. Hook up the TOYOTA hand – held – tester and TOYOTA break-out-box to the vehicle.
2. Read the ECU input/output values by following the prompts on the 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 operators manual for further details.

**INPUT SIGNAL CHECK****Output of Code**

1. (a) For check No. 1 ^– No.2

Turn the ignition switch on.

(b) For check No.3 –v No.7

(1) Turn the ignition switch on.

(2) Shift to D position.

(c) For check No.8 ^– No.9

(1) Jack up the vehicle.

(2) Start the engine. (3) Shift to D position.

2. Press the control switch to SET/COAST or RES/ACC position and hold it down.

3. Push the main switch on (Z).

4. Check that the CRUISE MAIN indicator light blinks twice or 3 times repeatedly after 3 seconds.

5. Turn the SET/COAST or RES/ACC switch off.

6. Operate each switch as listed in the table below.

7. Read the blinking pattern of the CRUISE MAIN indicator light.

8. After performing the check, turn the main switch off.

HINT: When 2 or more signals are input to the ECU, only the lowest-numbered code is displayed.

No.	Operation Method	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
1	Turn SET/COAST switch ON.		SET/COAST switch circuit is normal.
2	Turn Res/ACC switch ON.		RES/ACC. switch circuit is normal.
3	Turn CANCEL switch ON..		CANCEL switch circuit is normal.
4	Turn stop light switch ON. (Depress brake pedal)		Stop light switch circuit is normal.
5	Turn parking brake switch ON.		Parking brake switch circuit is normal.
6	Turn park/neutral position switch ON. (Shift to N or P range.)		Park/Neutral position switch circuit is normal.
7	Drive at 40 km/h (25 mph) or higher.		No. 1 Vehicle speed sensor is normal.
8	Drive at 40 km/h (25 mph) or below.		

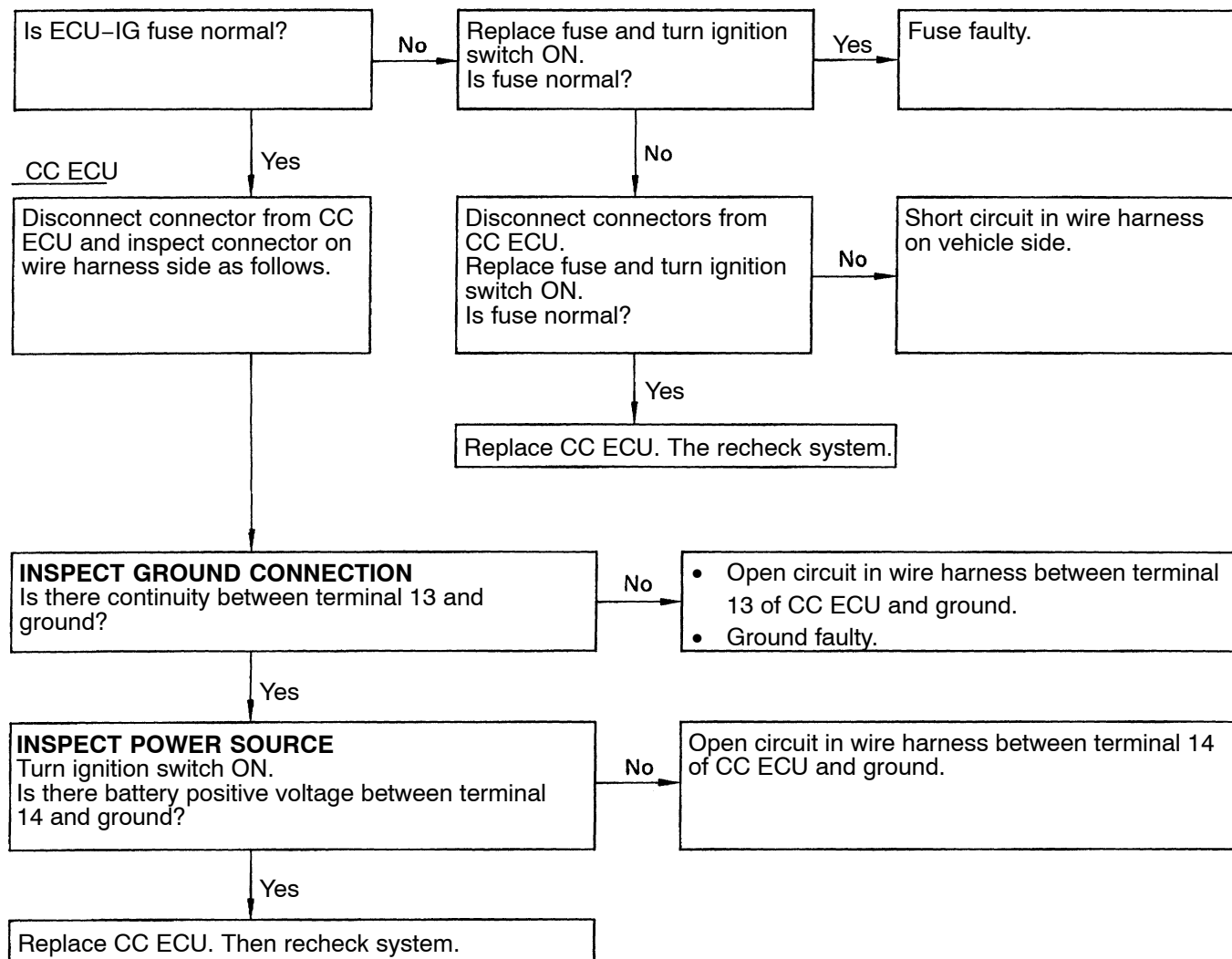
TROUBLESHOOTING

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.					C	D	D	F	H, I	G	E	I	J		
Inspection Item															
DTC	Type B	Type A		CC ECU	Actuator	Main Switch (in Control Switch)	Control Switch	Stop Light Switch	Park/Neutral Position Switch	Parking Brake Switch	No. 1 Vehicle Speed Sensor	No-2 Solenoid	Throttle Position Sensor (ILD)	Speed Control Cable, Control Link	Other Parts
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							
	13			2	1										
	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 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					1						
		NG	2												
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	4	5	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				
Acceleration response in sluggish when speed control switch turned to "ACCEL" or "RESUME".				6	3		1					4	5	2	
*: Inspect wire harness.															

A POWER SOURCE CIRCUIT

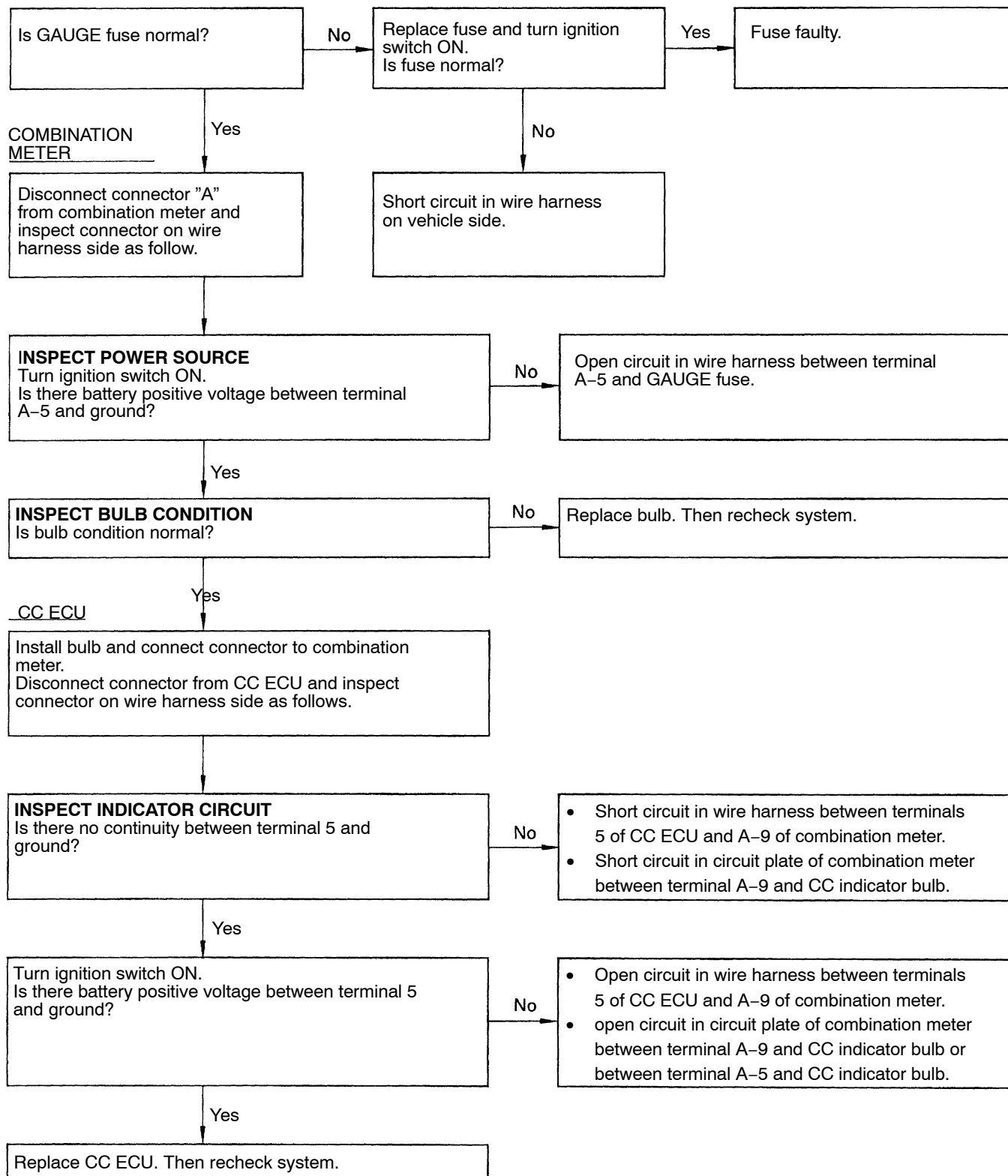
HINT: while carrying out the following inspection, make certain that the connectors and terminals are properly connected.



CC: Cruise Control

B CRUISE CONTROL INDICATOR CIRCUIT

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



CC: Cruise Control

C ACTUATOR CIRCUIT

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

ACTUATOR

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

INSPECT GROUND CONNECTION

Is there continuity between terminal 4 and ground?

No

- Open circuit in wire harness between terminal 4 of actuator and ground.
- Ground faulty.

Yes

INSPECT ACTUATOR (See page BE-1 14)

Is actuator operation normal?

No

Replace actuator. Then recheck system.

Yes

STOP LIGHT SWITCH

INSPECT STOP LIGHT SWITCH INSTALLATION

Is stop light switch installed properly?

No

Reinstall stop light switch properly. Then recheck system.

Yes

Connect connector to actuator.
Disconnect connector from stop light switch and inspect connector on wire harness side as follows.

INSPECT MAGNET CLUTCH CIRCUIT

Is there approx. 38.5Ω between terminal 4 and ground?

No

Open or short circuit in wire harness between terminals 4 of stop light and 5 of actuator.

Yes

INSPECT STOP LIGHT SWITCH (See page BE-1 13)

Is stop light switch operation normal?

No

Replace stop light switch. Then recheck system.

Yes

CONTINUED ON NEXT PAGE

CC: Cruise Control

CONTINUED FROM PREVIOUS PAGE

CC ECU

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

INSPECT MAGNET CLUTCH CIRCUIT

Is there approx. 38.5Ω between terminal 10 and ground?

No

Open or short circuit in wire harness between terminals 10 of CC ECU and 5 of actuator.

Yes

INSPECT MOTOR CIRCUIT

Is there no continuity between terminal 12 and ground?

No

Short circuit in wire harness between terminals 12 of CC ECU and 6 of actuator.

Yes

Is there no continuity between terminal 1 1 and ground?

No

Short circuit in wire harness between terminals 1 1 of CC ECU and 7 of actuator.

Yes

Is there continuity between terminals 12 and 1 1 with actuator arm in a position except max. open or max. close?

No

Open circuit in wire harness between terminals 12 of CC ECU and 6 of actuator or between terminals 1 1 of CC ECU and 7 of actuator.

Yes

INSPECT POSITION SENSOR CIRCUIT

Is there no continuity between terminal 24 and ground?

No

Short circuit in wire harness between terminals 24 of CC ECU and 1 of actuator.

Yes

Is there approx. $2\text{ k}\Omega$ between terminals 24 and 26?

No

- Open circuit in wire harness between terminals 26 of CC ECU and 3 of actuator.
- Open circuit in wire harness between terminals 24 of CC ECU and 1 of actuator.

Yes

Does resistance change even between terminals 26 and 25?

No

Open or short circuit in wire harness between terminals 25 of CC ECU and 2 of actuator.

Yes

Replace CC ECU. Then recheck system.

CC: Cruise Control

D 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-1 13)
 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 no continuity between terminal 4 and ground with main switch OFF?

No

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

Yes

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

No

Open circuit in wire harness between terminals 4 of CC ECU and 5 of control switch.

Yes

INSPECT CONTROL SWITCH CIRCUIT
 Is there no continuity between terminal 1\$ and ground with control switch OFF?

No

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

Yes

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

Position	Resistance (Ω)
R ES/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.

E NO. 1 VEHICLE SPEED SENSOR CIRCUIT

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

NO.1 VEHICLE SPEED SENSOR

Disconnect connector from No. 1 vehicle speed sensor 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 No.1 vehicle speed sensor and ground.
- Ground faulty.

Yes

INSPECT NO. 1 VEHICLE SPEED SENSOR

(See page [BE-114](#))

Is No. 1 vehicle speed sensor operation normal?

No

Replace No. 1 vehicle speed sensor. Then recheck system.

Yes

CC ECU

Connect connector to No. 1 vehicle speed sensor. Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

INSPECT NO. 1 VEHICLE SPEED SENSOR CIRCUIT

Is there continuity repeatedly between terminal 20 and ground?

No

- Open or short circuit in wire harness between terminals 20 of CC ECU and 2 of No. 1 vehicle speed sensor.

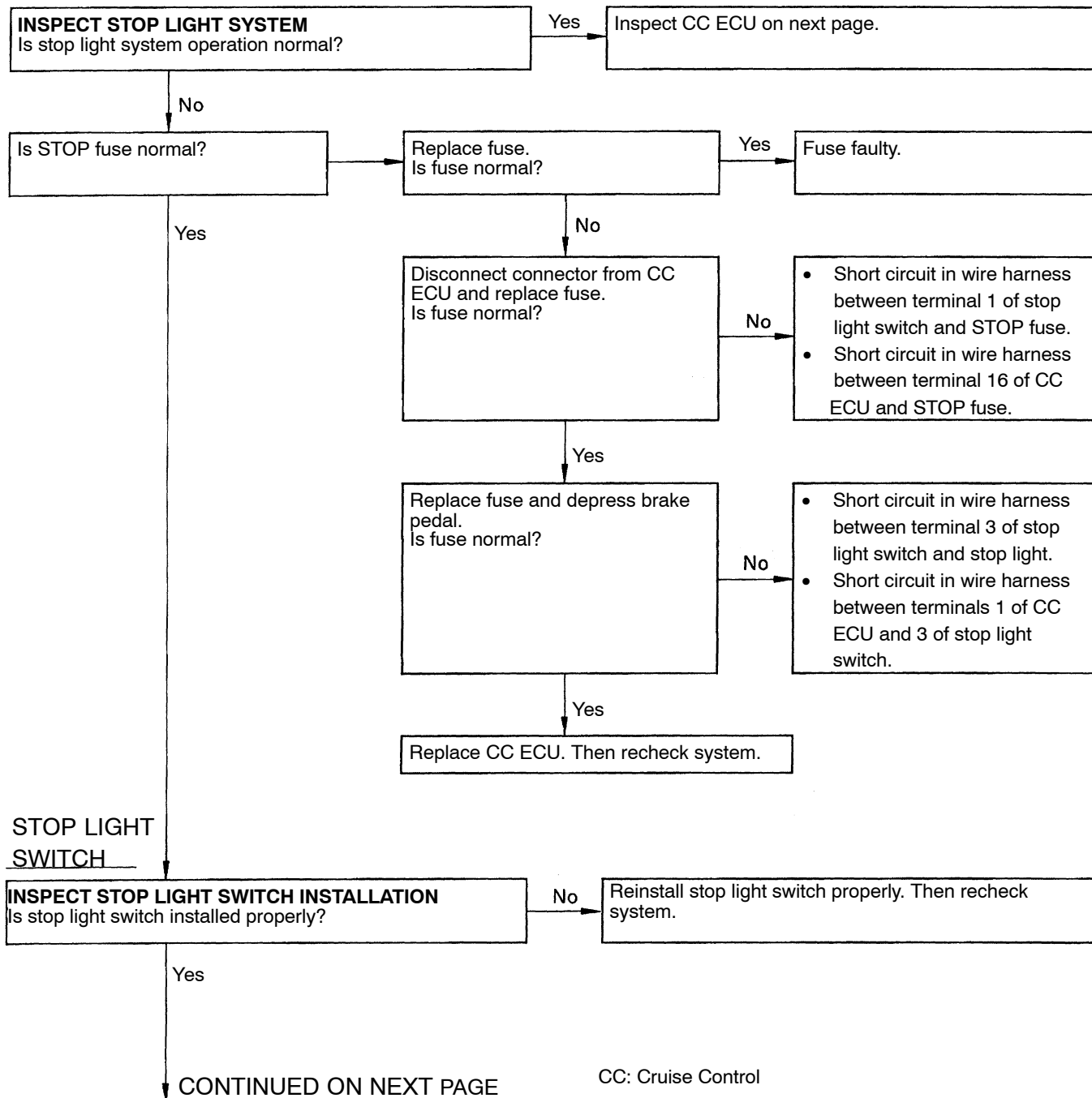
Yes

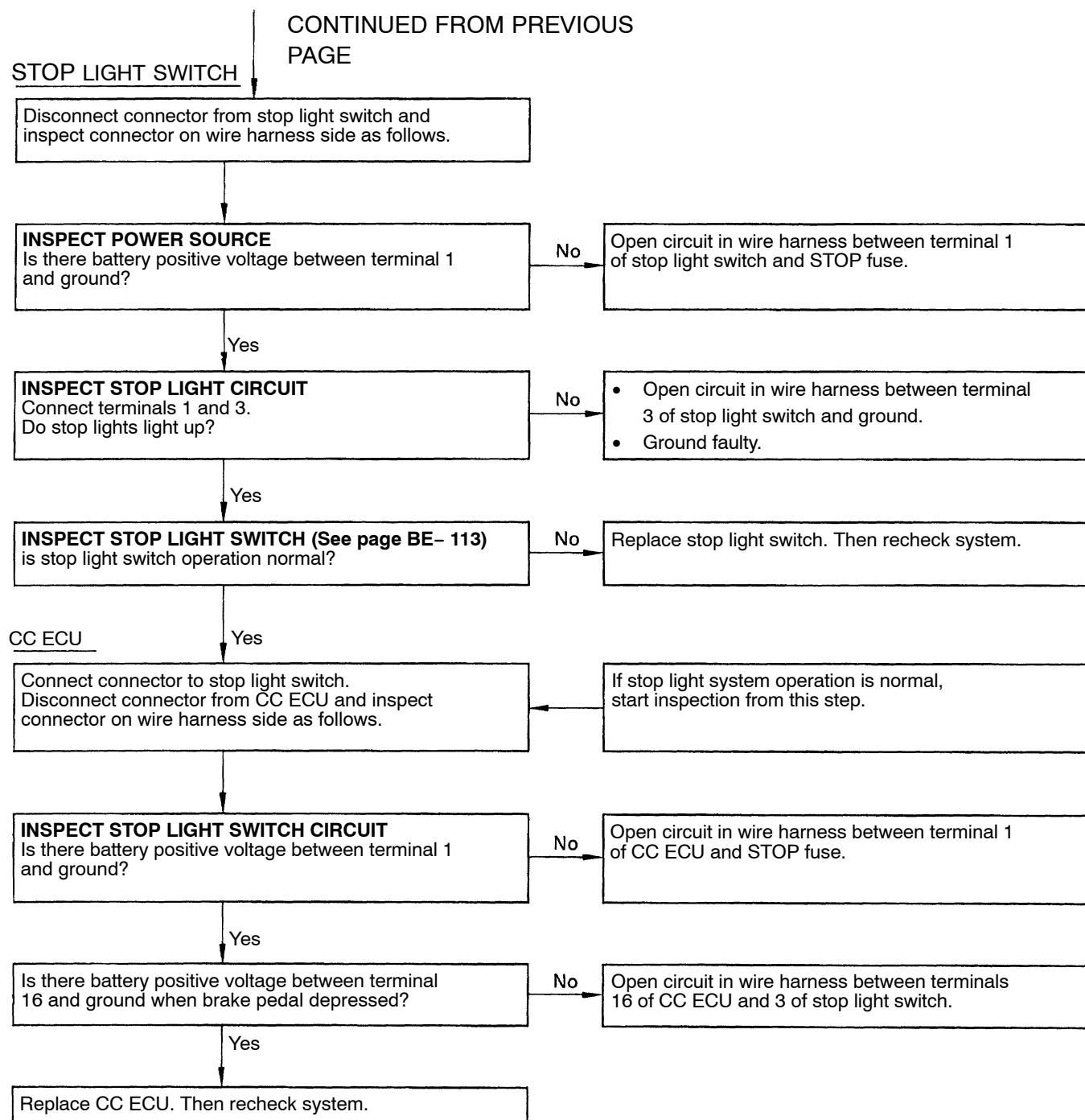
Replace CC ECU. Then recheck system.

CC: Cruise Control

F STOP LIGHT SWITCH CIRCUIT

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

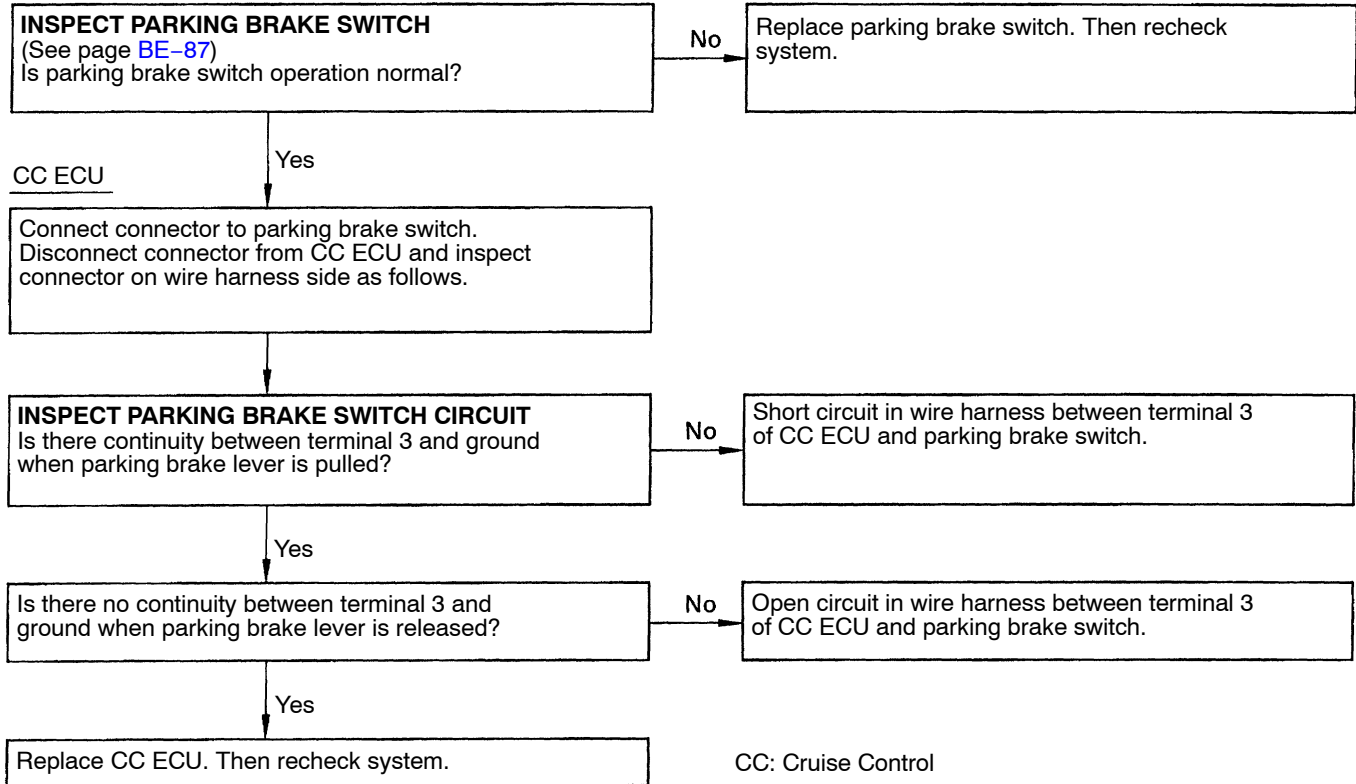




CC: Cruise Control

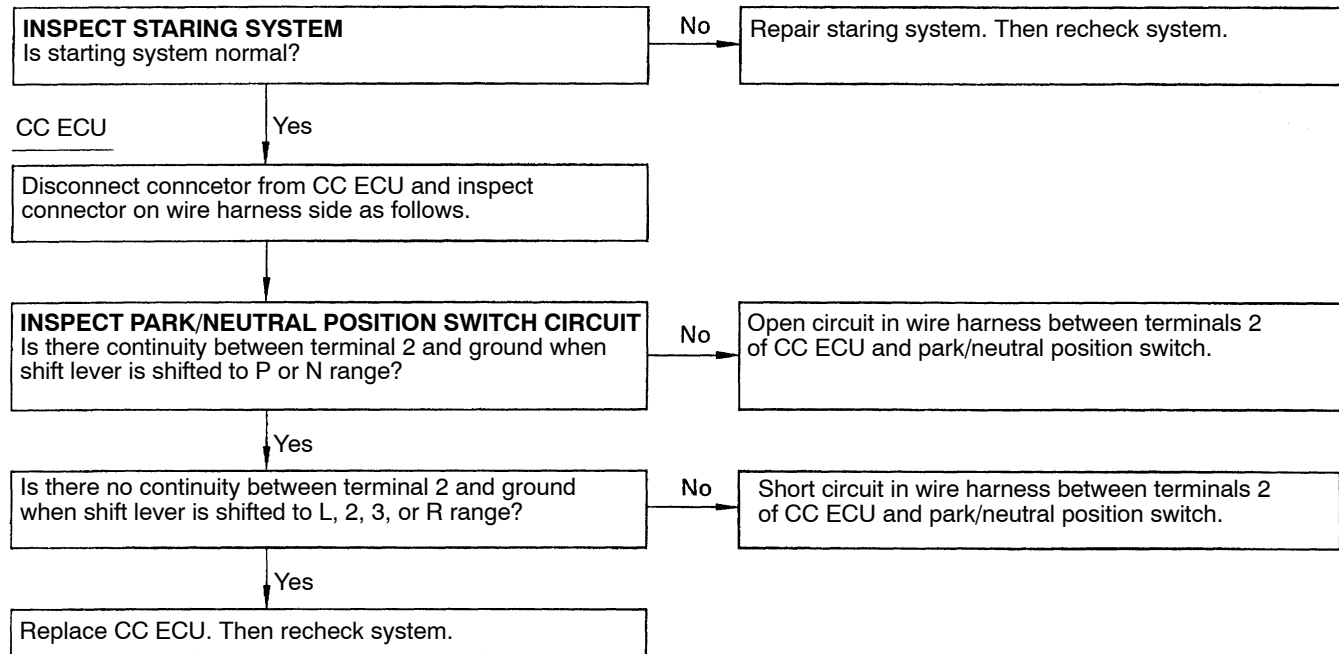
G PARKING BRAKE SWITCH CIRCUIT

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



H PARK/NEUTRAL POSITION SWITCH CIRCUIT

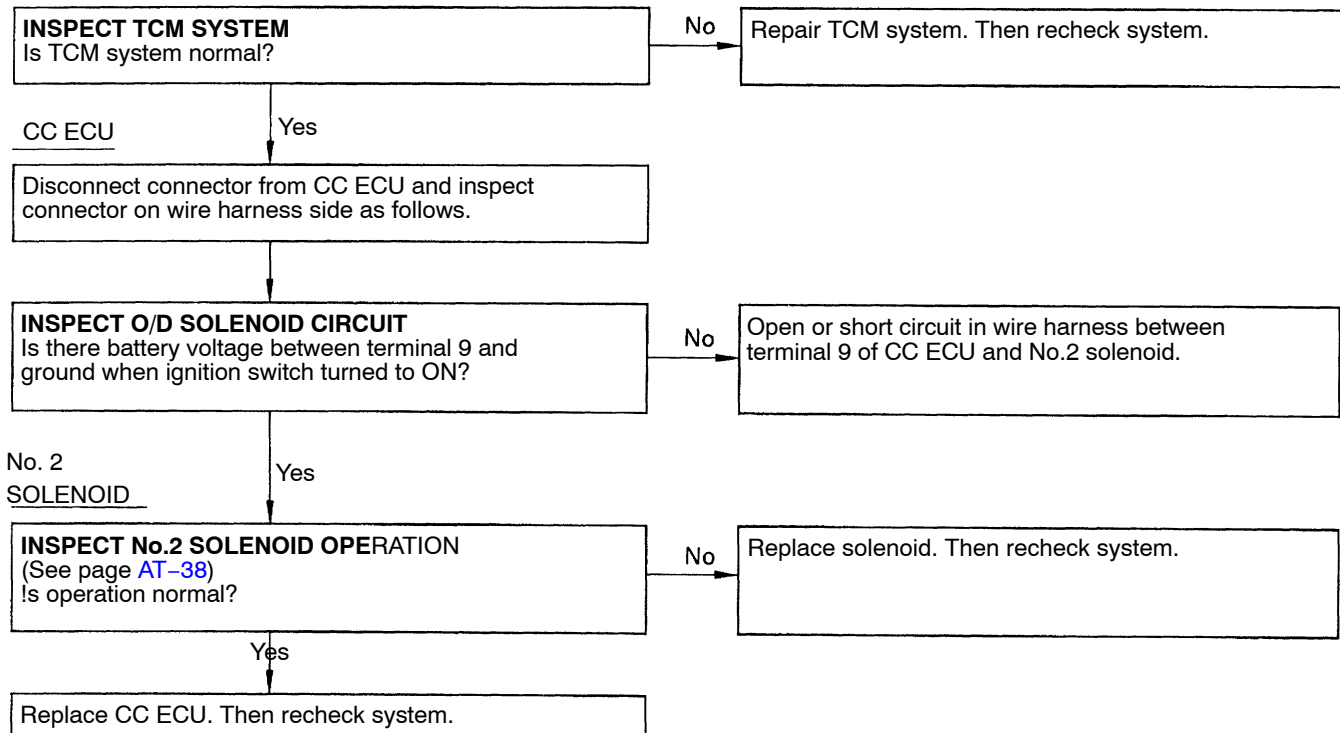
HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



CC: Cruise Control

I No.2 SOLENOID CIRCUIT

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

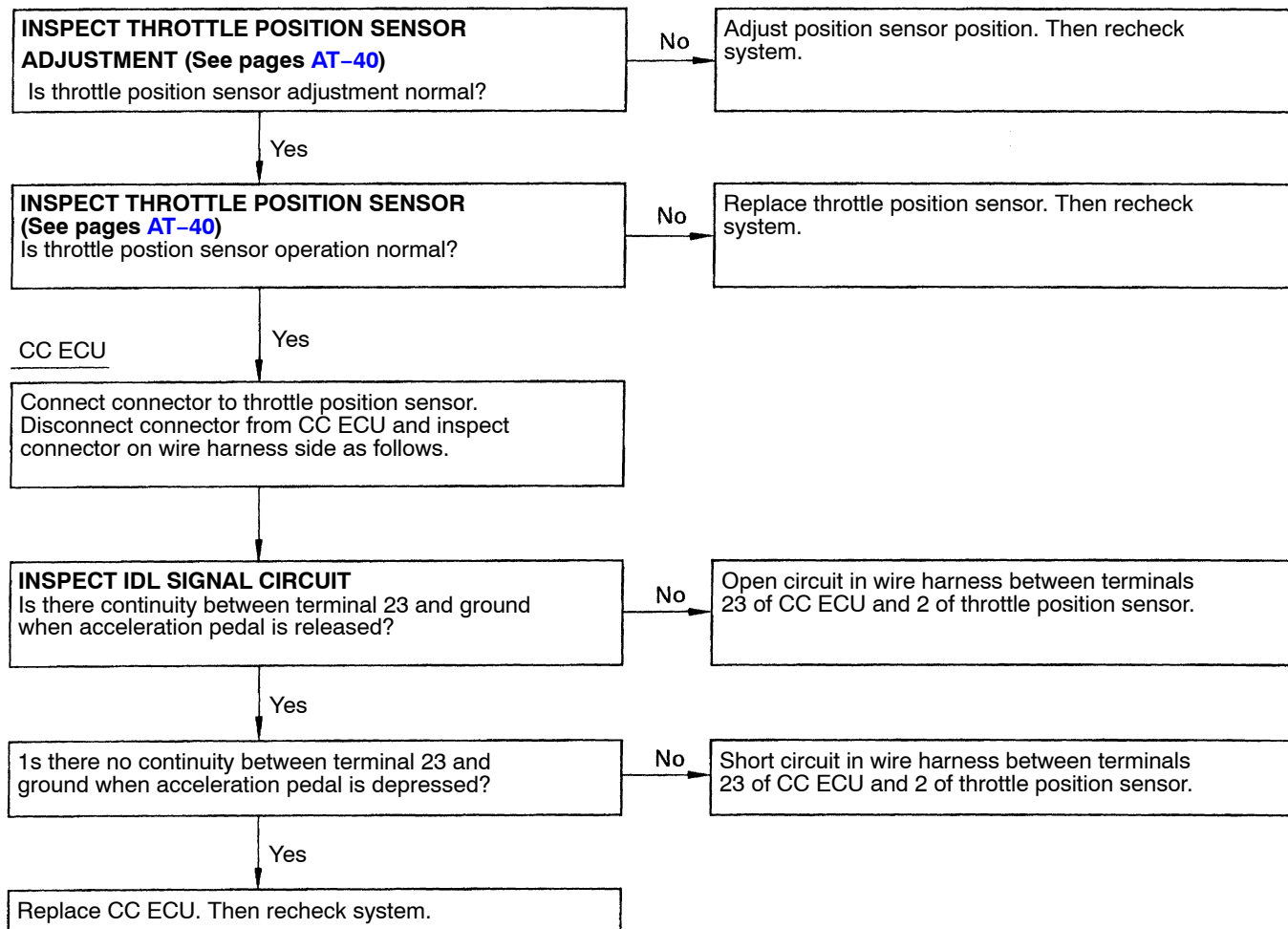


CC: Cruise Control

J IDL SIGNAL CIRCUIT

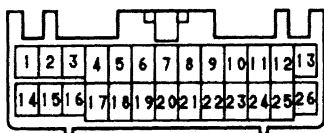
HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected,

THROTTLE POSITION SENSOR



CC: Cruise Control

Wire Harness Side



Vd-26-1-B

Z06838

CRUISE CONTROL ECU INSPECTION

INSPECT CRUISE CONTROL ECU

Continuity

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

Check for	Measured item	Tester connection	Condition			Specified value
Continuity	Park/Neutral position switch	2 – ground	Shift lever position	NorP	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
	Control switch	18 – ground	Control switch position	RES/ACC.	680	
			Control switch position	SET/COAST	1980	
			Control switch position	CANCEL	4180	
	Actuator (motor)	*11 – 12	Actuator arm position	rmax. OPEN	(12 – 11) Continuity	
				max. CLOSE	(11 – 12) Continuity	
				any position except above position	(12 – 11) Continuity	
DLC 1 Circuit	8 – ground	Constant			No continuity	
		Terminals Tc and E 1 connected			Continuity	
Throttle position sensor (IDL)	23 – ground	Acceleration pedal position	released	Continuity		
			depressed	No continuity		
No. 1 vehicle speed sensor	20 – ground	With ignition switch ON, speedometer shaft or No.1 vehicle speed sensor shaft turned.			Continuity No continuity	
Resistance	Actuator (position sensor)	24 – 26	Constant			Approx. 2 kΩ
		24 – 2 5	Actuator arm turned		Resistance change even	
	Actuator (magnet clutch)	10 – ground	Brake pedal position	released	Approx. 38.5 0	
				depressed	No continuity	
Voltage	Power source	14 – ground	Ignition switch position	LOCK or ACC	No voltage	
				ON	Battery positive voltage	
	STOP fuse	1 – ground	Constant			Battery positive voltage
	Stop light	16 – ground	Brake pedal position	released	No voltage	
				depressed	Battery positive voltage	
	No.2 solenoid	9 – ground	Ignition switch position	LOCK or ACC	No voltage	
ON				Battery positive voltage		
* : This circuit include the diode.						

If circuit is as specified, try another ECU.

If circuit is not as specified, inspect the circuits connected to other parts.

CRUISE CONTROL SWITCH INSPECTION

INSPECT CRUISE CONTROL SWITCH

Continuity

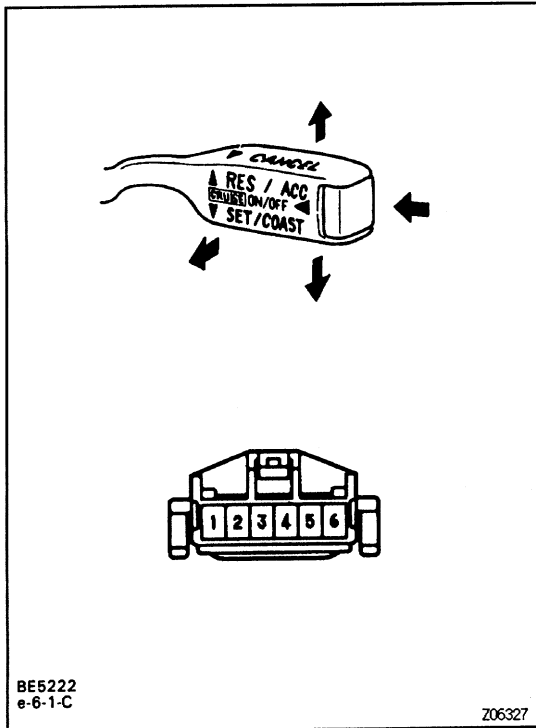
(a) Check continuity between terminals 3 and 5.

Control Switch Position	Condition
OFF	No continuity
ON (pushed)	Continuity

(b) Measure resistance between terminals 3 and 4.

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

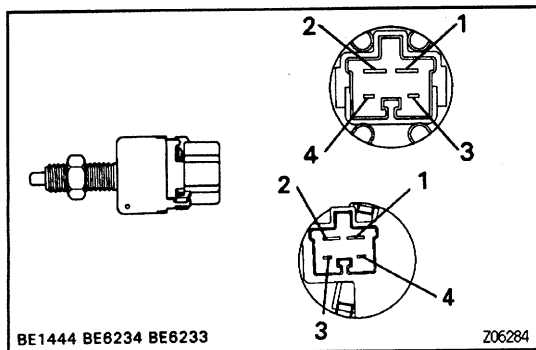
If resistance value is not as specified, replace the control switch.



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 - 2	Continuity
Switch pin pushed in (Brake pedal released)	3 - 4 (w/ CCS)	Continuity

If continuity is not as specified, replace the switch.

PARK/NEUTRAL POSITION SWITCH^{BE0LA-01} INSPECTION

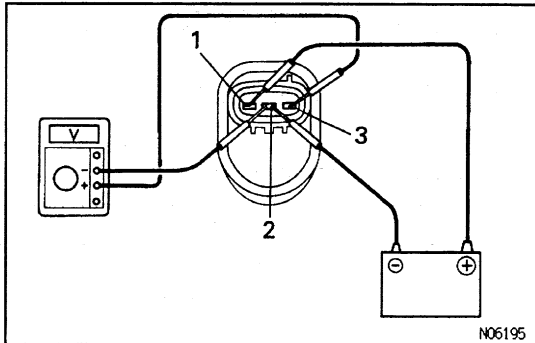
INSPECT PARK/NEUTRAL POSITION SWITCH

See page [AT-41](#).

PARKING BRAKE SWITCH INSPECTION

INSPECT PARKING BRAKE SWITCH

See page [BE-53](#).



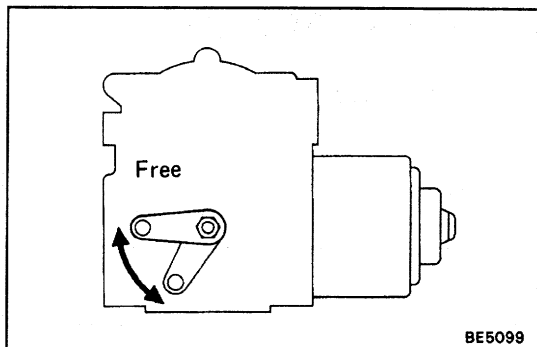
NO.1 VEHICLE SPEED SENSOR^{BE0LE-01} INSPECTION

INSPECT NO.1 VEHICLE SPEED SENSOR

- Connect the positive (+) lead from battery to terminal 1 and negative (-) lead to terminal 2.
- Connect the positive (+) lead from tester to terminal 3 and negative (-) lead to terminal 2.
- Revolve shaft.
- Check that there is voltage changer from approx. 0 V to 1.1 V or more between terminal 3 and 2.

HINT: The voltage change should be 4 times per each revolution of the No.1 vehicle speed sensor shaft.

If operation is not as specified, replace the sensor.

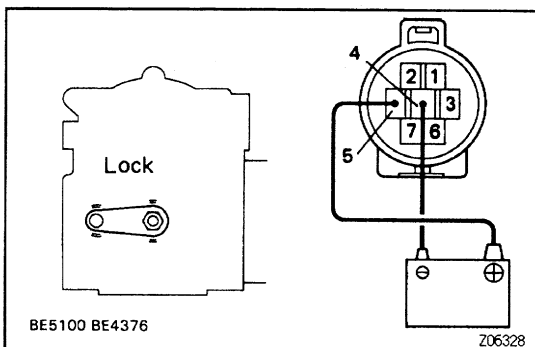


ACTUATOR INSPECTION

INSPECT ACTUATOR

Magnet Clutch

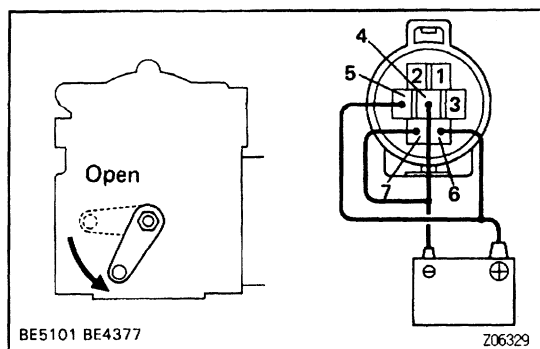
- Check that the arm moves smoothly by hand.



- Connect the positive (+) lead from the battery to terminal 5 and the negative (-) lead to terminal 4. (Magnet clutch turned ON)

- Check that the arm does not move by hand.

If operation is not as specified, replace the motor.

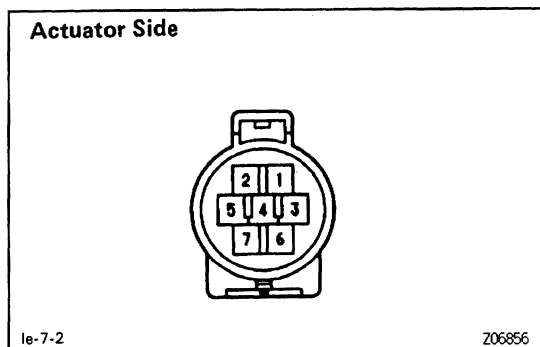
**MOTOR**

(a) With the magnet clutch ON, connect the positive (+) lead from the battery to terminal 6 and the negative (-) lead to terminal 7, check that the arm moves to the open side.

(b) When the arm reached to the open position, check that the motor operation stops.

(c) With the magnet clutch ON, connect the positive (+) lead from the battery to terminal 7 and the negative (-) lead to terminal 6, check that the arm moves to the close side.

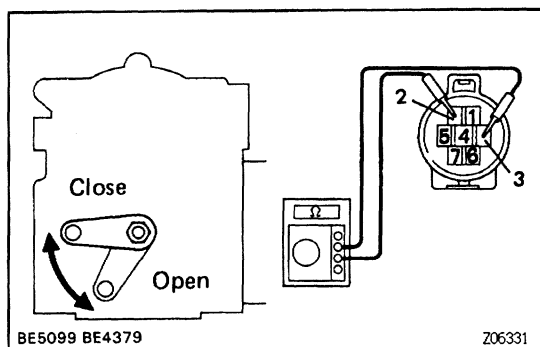
(d) When the arm reaches to the closed position, check that the motor operation stops.

**Position Sensor**

(a) Measure the resistance between terminals 1 and 3.

Resistance:

Approx. 2 kΩ



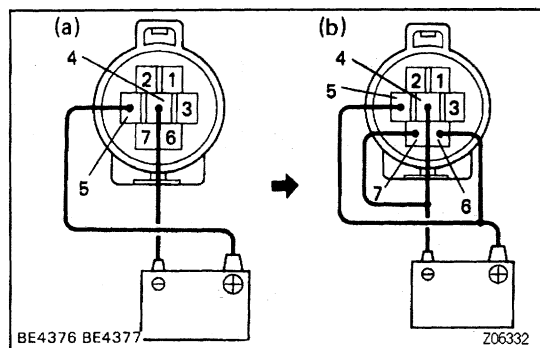
(b) When the arm is moving form the closed to open position, check that resistance between terminals 2 and 3 increases form approx. 0.5 to 1.7 kΩ

If operation is not as specified, replace the motor.

THROTTLE POSITION SWITCH INSPECTION

INSPECT THROTTLE POSITION SWITCH

See page [AT-40](#).



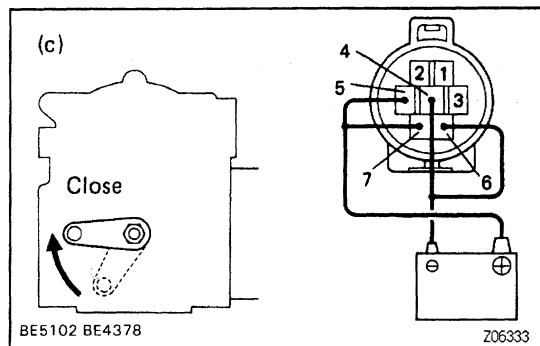
CONTROL LINK ADJUSTMENT

ASSEMBLY ADJUST CONTROL LINK

- (a) Connect the positive (+) lead from the battery to terminal 5 and the negative (-) lead to terminal 4 of the actuator.

(Magnet clutch turned ON)

NOTICE: Keep the magnet clutch ON until adjustment of control link assembly is completed.



- (b) With the magnet clutch ON, connect the positive (+) lead from the battery to terminal 6 and the negative (-) lead to terminal 7.

(Arm moves to the open side).

- (c) With the magnet clutch ON, connect the positive (+) lead from the battery to terminal 7 and the negative (-) lead to terminal 6.

(Arm moves to the close side).

- (d) Install the control link assembly to the actuator.

- (e) Rotate the control link assembly so that the catch of the control link assembly's lower side comes in contact with the actuator control arm (Free play 0)

Free play:

0 mm (0 in.)

NOTICE: Rotate the lower side link to the right until it touches the stopper.

- (f) In condition

- (d), install and torque the three nuts.

- (g) Disconnect lead wire from the actuator.

