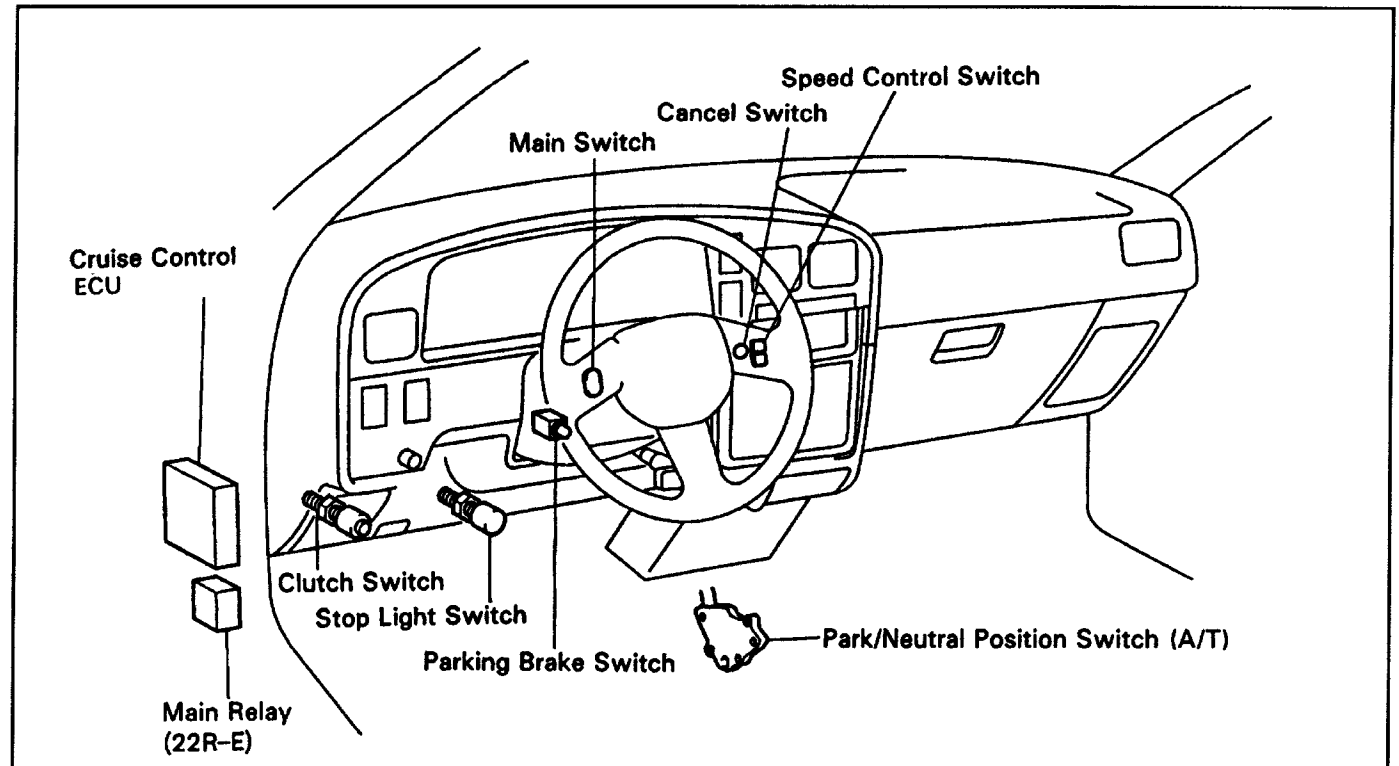
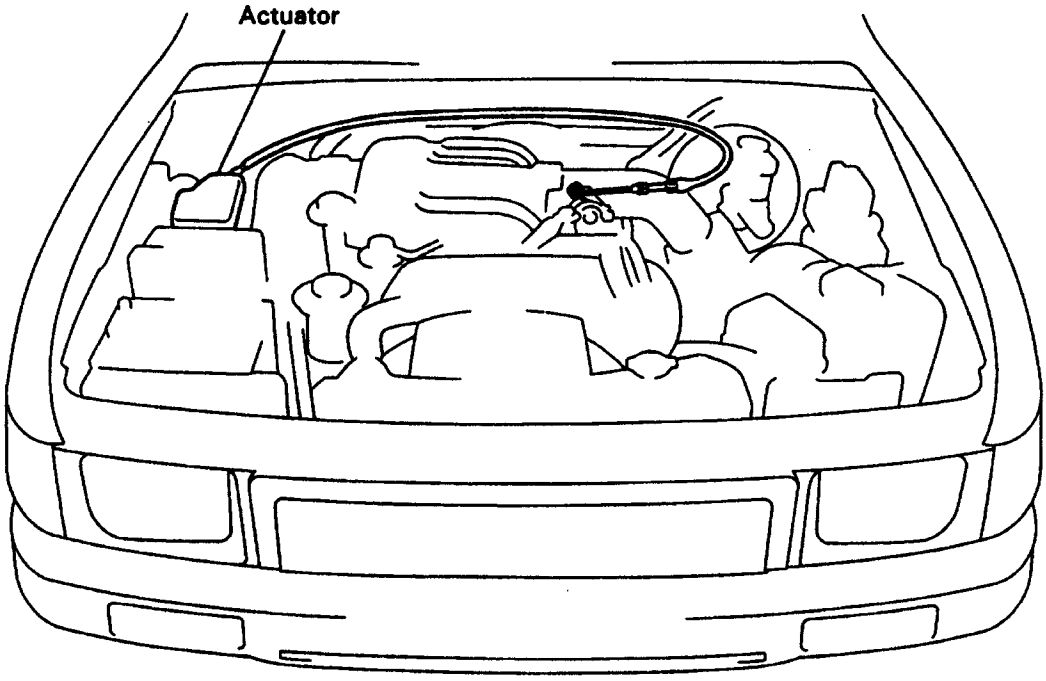
CRUISE CONTROL SYSTEM

PARTS LOCATION



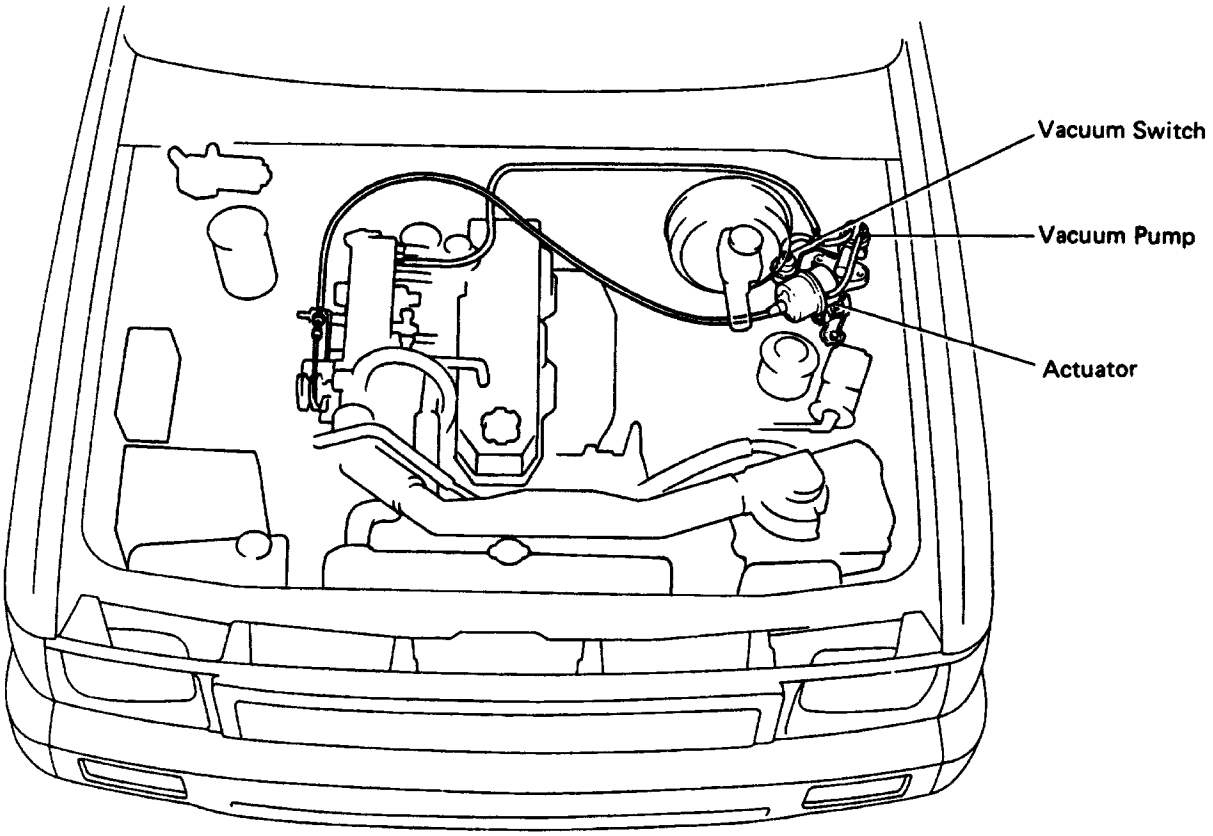
3VZ-E ENGINE



N09538
N09062

Z14381

22R-E ENGINE

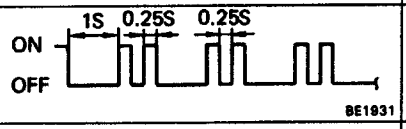
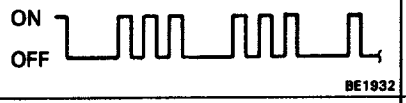
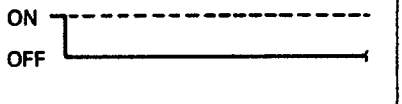
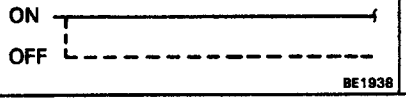


DIAGNOSIS SYSTEM

OUTPUT OF DIAGNOSTIC CODE READ DIAGNOSTIC CODE

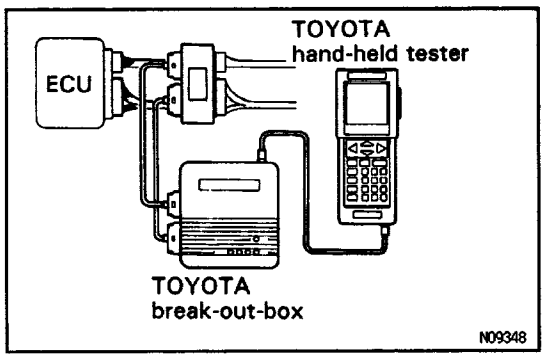
Type A

(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.		SET/COAST circuit is normal.
2	Push the cruise control switch RESUME/ACCEL on.		RESUME/ACCEL circuit is normal.
3	Vacuum switch is turned ON. (22R–E)		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 range) • Clutch switch • Parking brake switch		Each cancel switch is normal.
5	Drive approx. 40 km/h (25 mph) or over.		Speed sensor circuit is normal.
6	Drive approx. 40 km/h (25 mph) or below.		Speed sensor circuit is normal.

HINT:

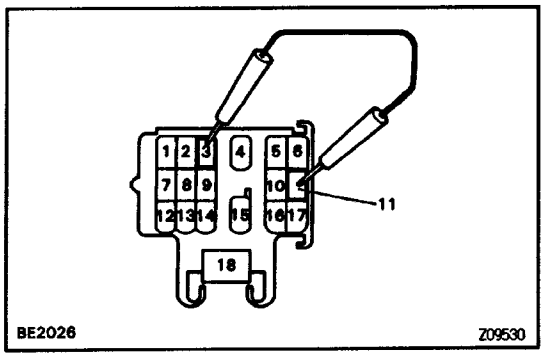
- Indication codes appear in order from No. 1.
- If there is no indication code, perform diagnosis and inspection. (See page BE–98)
- Indication is stopped, when the MAIN switch is pushed again.



ECM 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 ECM 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.



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 DLC 1.
HINT: Should the ignition switch be turned off, the diagnostic trouble code will be erased from the ECU memory.

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

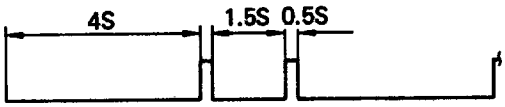
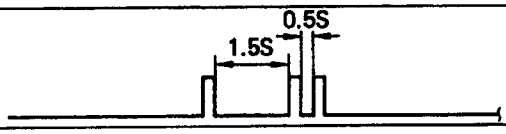
3VZ – E Engine:

DTC	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
–	ON / OFF  BE3931	Normal
11	ON / OFF  BE3931	• Overcurrent (short) in motor circuit.
12	ON / OFF  BE3931	• Overcurrent (short) in magnet clutch circuit. • Open in magnet clutch circuit.
13	ON / OFF  BE3931	• Position sensor detects abnormal voltage.
14	ON / OFF  BE3931	• Open in actuator motor circuit. • 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. • Vehicle Speed Sensor Pulse is abnormal.
32	ON / OFF  BE3933	Short in control switch circuit.
34	ON / OFF  BE3933	• Voltage abnormality in control switch.
41	ON / OFF  BE3934	• Duty ratio of 100% output to motor acceleration side.
42	ON / OFF  BE3934	• Source voltage drop.

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

*: If the set speed can be maintained when the speed control switch is again set at SET/COAST, there is no malfunction.

22R – E Engine:

Indication code	Diagnosis
	Normal.
11 	Control valve circuit of actuator is abnormal.
12 	Release valve circuit of actuator is abnormal.
21 	Speed sensor circuit is abnormal.
23 	*Vehicle speed has decreased by 16 km/h (10 mph) or more from the set speed.
32 	SET/COAST switch signal and RESUME/ACCEL switch signal stay on simultaneously.
34 	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.

41 	

HINT:

- Indication codes appear in order from No.11.
- If there is no indication code, perform diagnosis and inspection. (See page BE–98)

TROUBLESHOOTING

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

( ): 22R–E Engine Only

Chart No.				C	A	B	E	G,H	F	I	I	D		K			J	
Inspection Item / Diagnosis Trouble Code / Problem	Type B	Type A		Cruise Control ECU	Actuator	Main Switch (in Control Switch)	Control Switch	Stop Light Switch	Clutch Switch or Park / Neutral Position Switch	Parking Brake Switch	(¿¿cuum Switch)	(¿¿cuum Pump)	Whicle Speed Sensor*1 or Speedometer Cable	Speed Control Cable Function	Throttle Position Sensor (IDL)	Wire Harness	Indicator Light	No.2 Solenoid	(Others)
• "CRUISE" Indicator light blinks. • Cruise control system goes not set. • Cruise control system does not operate.	11	–		3	2											1			
	12	–		4	2			3								1			
	13*2	–		3	2											1			
	14*2	–		3	2											1			
	21	–		3									2			1			
	23	–		4 (7)	(3)						6	5	2 (4)	3 (2)		1			*3
	32	–		3			2									1			
	34	–		3			2									1			
	41	–		3	2														
	42*2	–		Source voltage drop															
	(Normal)	5	OK	8	7	1	2	3	4	5				6					*4
			NG	2									1						
Indicator light does not light up.				3												1	2		
Large speed drop when the cruise control switch pushed to SET.				4	3									1	2				
Vehicle speed fluctuates when cruise control switch pushed to SET.				4	3								(1)	1 (2)	2				
Set speed deviates on high or low side.				4	3						6	5	1	2					
Acceleration response is sluggish when cruise control switch turned to "ACCEL" or RESUME"				5	4		3					6	2	1					*3
Cruise control system does not set. Cruise control system does not operate.	4		OK	9	8	2	3	4	5	6				7		1			
			NG	2									1						
Set speed does not cancel when parking brake pedal depressed.	3 (4)		OK	1 (3)	(1)			(2)											
			NG	2				1											
Set speed does not cancel when parking brake lever pulled.	3 (4)		OK	1 (2)	(1)														
			NG	2						1									
Cruise control not cancelled, even when transmission is shifted to except D position	3 (4)		OK	1 (2)	(1)														
			NG	2					1										
Set speed does not cancel when shifted to N position (A/T).	3 (4)		OK	1 (2)	(1)					1									
			NG	2					1										
Set speed does notcancel when clutch pedal depressed	3 (4)		OK	1 (2)	(1)					1									
			NG	2					1										
Set speed does not cancel when cruise control switch pushed to CANCEL	3 (4)		OK	1 (2)	(1)														
			NG	2			1												
Vehicle speed does not decrease when cruise control switch pushed to COAST.	1		OK	4 (3)	1								3	2					
			NG	2			1												
Vehicle speed does not accelerate when cruise control switch pushed to ACCEL.	2		OK	4 (3)	1								3	2					
			NG	2			1												
Vehicle speed does not return to memorized cruise when control switch pushed to RESUME	2		OK	4 (3)	1								3	2					
			NG	2			1												
Speed can be set below about 40 km/h (25 mph.)	4 (5)		OK	1 (2)	(1)														
			NG	2									1						
Cruise control does not disengage even at about 40 km/h (26 mph) or less.	4 (5)		OK	2	1														
			NG	2 (3)									1	(2)					

*1: In the Speedometer *2: 3VZ–E Engine Only *3: Vacuum Hose *4: Vacuum Hose & Brake Fluid

A INSPECTION OF POWER SOURCE CIRCUIT

Turn ignition switch on.

Is ENGINE fuse normal?

No → Replace fuse. Is operation normal?

No →
- Short circuit in wire harness between ENGINE fuse and terminal 2 of main relay.
- Inspect main relay. (See page BE–119)

Yes

Yes → Fuse faulty.

MAIN RELAY (22 R–E)

INSPECT GROUND CONNECTION
Disconnect connector from main relay.
Is there continuity between terminal 3 of main relay and ground?

No →
- Open circuit in wire harness between terminal 3 of main relay and ground.
- Ground faulty.

Yes

INSPECT POWER SOURCE
Is there battery positive voltage between terminal 2 of main relay and ground with ignition switch turned on?

No → Open circuit in wire harness between ENGINE fuse and terminal 2 of main relay.

Yes

INSPECT MAIN RELAY OPERATION
Is main relay operation normal?
(See page **BE–119**)

No → Main relay faulty.
Replace main relay. Then recheck system.

Yes

Is there continuity between terminal 6 on wire harness side connector and ground?

Yes → Short circuit in wire harness between terminals 6 of main relay and 12 of CC ECU.

No

Is there continuity between terminal 1 on wire harness side connector and ground?

Yes → Short circuit in wire harness between terminals 1 of main relay and 10 of CC ECU.

No

CONTINUED ON NEXT PAGE

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Disconnect combination switch connector.

Is there continuity between terminal 4 of main relay connector on wire harness side and ground?

Yes → Short circuit in wire harness between terminals 4 of main relay and 4I6 of slip ring.

No

Connect connector to main relay.

SLIP RING

Disconnect connectors from slip ring.

INSPECT POWER SOURCE
Is there battery positive voltage between terminal 4/6 on wire harness side connector and ground with ignition switch turned on?

No → Open circuit in wire harness between terminals 4 of wire harness side connector and 4/6 of slip ring.

Yes

INSPECT GROUND CONNECTION
Is there continuity between terminal 5I6 on . wire harness side connector and ground?

No → Open circuit in wire harness side between terminal 5/6 of slip ring and ground.

Yes

INSPECT SLIP RING CONTINUITY
Is slip ring continuity normal?
(See page BE–119)

No → Slip ring faulty.
Replace slip ring. Then recheck system.

Yes

MAIN SWITCH

Disconnect connector from main switch.

Is there continuity between terminals 1/2 and 3I5 of speed control switch?

No → Open circuit in speed control switch between terminals 1/2 and 3I5.

Yes

INSPECT MAIN SWITCH CONTINUITY
Is main switch continuity normal?
(See page BE–117)

No → Main switch faulty.
Replace main switch. Then recheck system.

Yes

CONTINUED ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

Is there continuity between terminals 2/2 and 4/5 of cruise control switch?

No → Open circuit in cruise control switch between terminals 2/2 and 4/5.

Yes

Connect connectors to slip ring.

INSPECT POWER SOURCE
Is there battery positive voltage between terminal 1/2 of cruise control switch and ground with ignition switch turned on?

No → Short circuit in wire harness between terminals 1/2 and 3/5 of cruise control switch.

Yes

Connect connector to main switch.

→ ※

ECU (22R–E)

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

INSPECT GROUND CONNECTION
Is there continuity between terminal 15 and ground?

No →
- Open circuit in wire harness between terminal 15 and ground.
- Ground faulty.

Yes

INSPECT POWER SOURCE
Is there battery positive voltage between terminal 12 and ground with ignition switch and main switch is turned on?

No → Open circuit in wire harness between terminals 12 of CC ECU and 1 of main relay.

Yes

Disconnect connector from main relay.

Is there continuity between terminals 10 of CC ECU and 1 of main relay wire harness side connector?

No → Open circuit in wire harness between terminals 10 of CC ECU and 1 of main relay.

Yes

CONTINUED ON NEXT PAGE

CONTINUED ON PREVIOUS PAGE

INSPECT INDICATOR LIGHT CIRCUIT
Is GAUGE fuse normal?

No

Replace fuse.
Is operation normal?

No → Short circuit in wire harness between GAUGE fuse and terminal 4 of CC ECU.

Yes

Fuse faulty.

Yes

Connect terminal 4 to ground.
Does indicator light lights on with ignition switch turned on?

No →
- Open circuit in wire harness between GAUGE fuse and terminal 4 of CC ECU.
- Inspect indicator light.

Yea

CC ECU faulty.
Replace CC ECU. Then recheck system.

CC ECU (3VZ–E)

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

INSPECT GROUND CONNECTION
Is there continuity between terminal 13 and ground?

No →
- Open circuit in wire harness between terminal 13 of CC ECU and ground.
- Ground faulty.

Yes

INSPECT POWER SOURCE
Turn ignition switch ON.
Is there battery positive voltage between terminal 14 and ground?

No → Open circuit in wire harness between terminal 14 of CC ECU and ground.

Yes

Replace CC ECU. Then recheck system.

CC: Cruise Control

B INSPECTION OF SPEED CONTROL SWITCH CIRCUIT

Turn ignition switch off.

CRUISE CONTROL SWITCH

Disconnect connector from control switch.

INSPECT CONTROL SWITCH
Is control switch operation normal?
(See page **BE–117**)

No → Cruise control switch faulty.
Replace cruise control switch. Then recheck system.

Yes

SLIP RING

Disconnect connector from slip ring.

INSPECT GROUND CONNECTION
Is there continuity between terminal 5/6 on wire harness side connector and ground?

No →
- Open circuit in wire harness between terminal 5/6 of slip ring and ground.
- Ground faulty.

Yes

INSPECT SLIP RING CONTINUITY
Is slip ring continuity normal?
(See page BE–119)

No → Slip ring faulty.
Replace slip ring. Then recheck system.

Yes

ECU

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

INSPECT GROUND CONNECTION
Is there continuity between terminal 15 (13) and ground?

No →
- Open circuit in wire harness between terminal 15 (13) of CC ECU and ground.
- Ground faulty.

Yes

INSPECT SPEED CONTROL SWITCH CIRCUIT
Is there no continuity between terminals 19 (18) and 15 (13) with control switch is off?

No → Short circuit in wire harness between terminal 19 (18) of CC ECU and terminal 6/6 of slip ring.

Yes

Is there approx. 68Ω between terminals 19 (18) and 15 (13) with control switch RESUME/ACCEL is pushed on?

No → Open circuit in wire harness between terminal 19 (18) of CC ECU and terminal 6/6 of slip ring.

Yes

CC ECU faulty.
Replace CC ECU. Then recheck system.

( ): 3VZ–E

C ACTUATOR CIRCUIT

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

Turn ignition switch off.

VACUUM HOSE (22R–E)

Are there cracks or other damage on the vacuum hose?

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

No

ACTUATOR

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

INSPECT GROUND CONNECTION
Is there continuity between terminal 3 (4) and ground ?

No →
- Open circuit in wire harness between terminal 3 (4) of actuator and terminal 16 (26) CC ECU.
- Ground faulty.

Yes

INSPECT ACTUATOR (See page BE–120)
Is actuator operation normal?

No → Replace actuator. Then recheck system.

Yes

STOP LIGHT SWITCH

INSPECT STOP LIGHT SWITCH INSTALLATION
Is stop tight 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. 71Ω (38.5Ω) between terminal 4 and ground?

No → Open or short circuit in wire harness between terminals 4 of stop light and 1 (5) of actuator.

Yes

INSPECT STOP LIGHT SWITCH (See page BE–118)
Is stop light switch operation normal?

No → Replace stop tight switch. Then recheck system.

Yes

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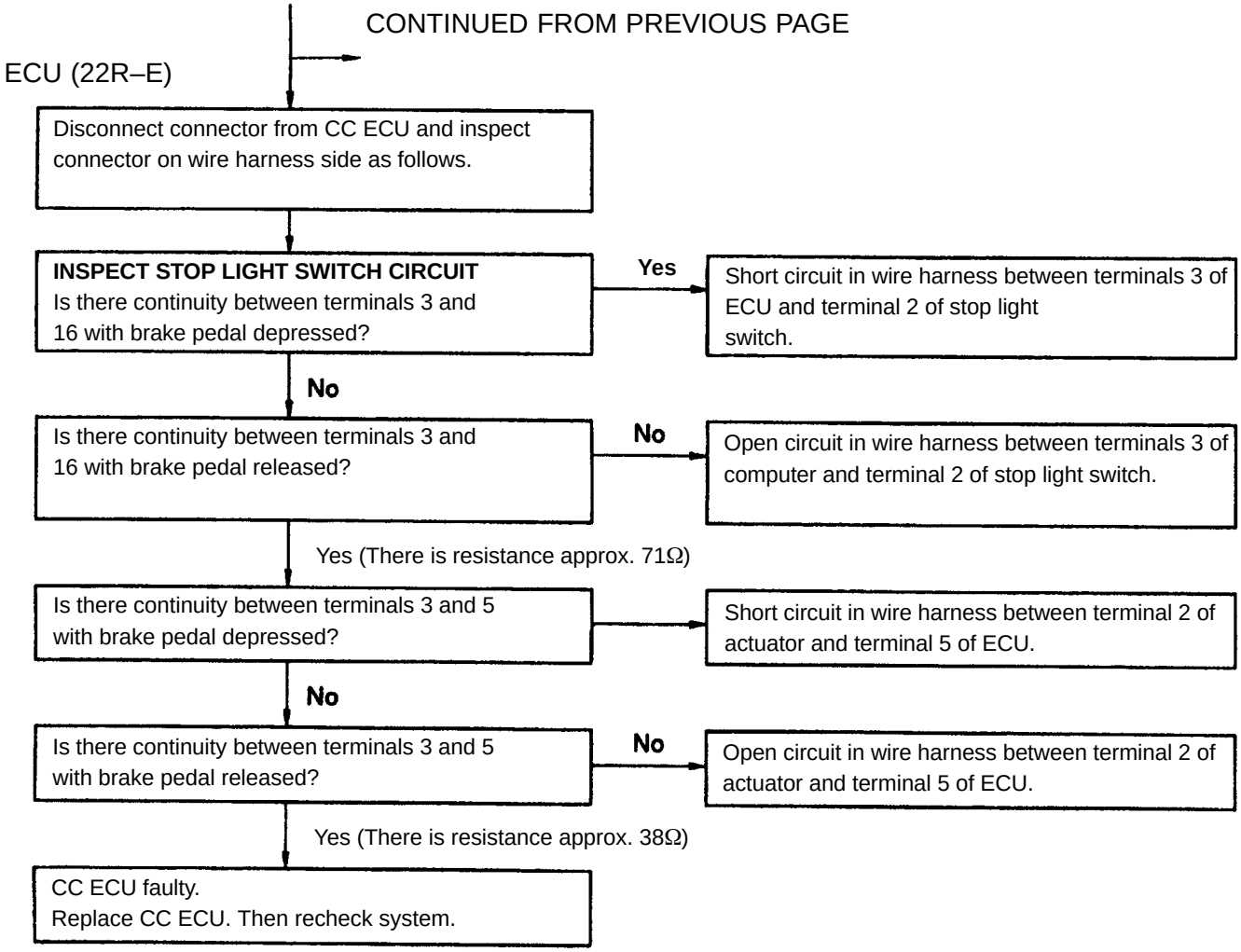
CC: Cruise Control
( ): 3VZ–E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ECU (22R–E)
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.
INSPECT STOP LIGHT SWITCH CIRCUIT
Is there continuity between terminals 3 and 16 with brake pedal depressed?
Yes
Short circuit in wire harness between terminals 3 of ECU and terminal 2 of stop light switch.
No
Is there continuity between terminals 3 and 16 with brake pedal released?
No
Open circuit in wire harness between terminals 3 of computer and terminal 2 of stop light switch.
Yes (There is resistance approx. 71Ω)
Is there continuity between terminals 3 and 5 with brake pedal depressed?
Short circuit in wire harness between terminal 2 of actuator and terminal 5 of ECU.
No
Is there continuity between terminals 3 and 5 with brake pedal released?
No
Open circuit in wire harness between terminal 2 of actuator and terminal 5 of ECU.
Yes (There is resistance approx. 38Ω)
CC ECU faulty.
Replace CC ECU. Then recheck system.

CONTINUED FROM PREVIOUS PAGE

CC ECU (3VZ–E)

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 267

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 11 and ground?

No → Short circuit in wire harness between terminals 11 of CC ECU and 7 of actuator.

Yes

Is there continuity between terminals 12 and 11 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 11 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 kΩ between terminals 24 and 267

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 INSPECTION OF SPEED SENSOR CIRCUIT

SPEED SENSOR

Disconnect connector from combination meter.

INSPECT GROUND CONNECTION
Is there continuity between terminal B of wire harness side connector and ground?

No →
- Open circuit in wire harness between terminal B of combination meter and ground.
- Ground faulty.

Yes ↓

INSPECT SPEED SENSOR OPERATION
Is there sensor operation normal?
(See page BE–48)

No → Vehicle speed sensor faulty.
Replace vehicle 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 (20) and ground change repeatedly from 0 V to approx.
5 V or more when speedometer shaft is turned?

No → Open or short circuit in wire harness between terminal 8(20) of CC ECU and terminal A of combination meter.

Yes ↓

CC ECU faulty.
Replace CC ECU. Then recheck system.

( ): 3VZ–E

E INSPECTION OF STOP LIGHT SWITCH CIRCUIT

Turn ignition switch off.

Is STOP fuse normal?
- No → Replace fuse. Is operation normal?
  - No → Short circuit in wire harness between terminal 18 (1) of CC ECU or terminal 1 of stop light switch and fuse.
  - Yes → Fuse faulty.
- Yes

STOP LIGHT SWITCH

INSPECT GROUND CONNECTION
Disconnect connector from stop light switch. Is there continuity between terminal 3 of wire harness side connector and ground?
- No →
  - Open circuit in wire harness between terminal 3 and ground.
  - Bulb burned out.
  - Ground faulty.
- Yes

INSPECT STOP LIGHT SWITCH OPERATION
Is stop light switch operation normal?
(See page BE–118)
- No → Stop light faulty. Replace stop light switch. Then recheck system.
- Yes

Connect connector to stop light switch.

ECU

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

INSPECT STOP FUSE CIRCUIT
Is there battery positive voltage between terminal 17 (16) and ground with brake pedal released?
- Yes → Short circuit in wire harness between terminal 17 (16) of CC ECU and STOP fuse.
- No

Is there battery positive voltage between terminal 17 (16) and ground with brake pedal depressed?
- No → Open circuit in wire harness between terminal 17 (16) of CC ECU and STOP fuse.
- Yes

CC ECU faulty.
Replace CC ECU. Then recheck system.

( ): 3VZ–E

F INSPECTION OF PARKING BRAKE SWITCH CIRCUIT

Turn ignition switch off.

BRAKE FLUID LEVEL WARNING SWITCH

INSPECT GROUND CONNECTION
Disconnect connector from brake fluid level warning switch.
Is there continuity between terminal 2 of wire harness side connector and ground?

No →
- Open circuit in wire harness between terminal 2 of brake fluid level warning switch.
- Ground faulty.

Yes ↓

INSPECT LEVEL WARNING SWITCH
Is brake fluid level warning switch operation normal?
(See page BE–53)

No → Brake fluid level warning switch faulty.
Replace level warning switch.

Yes ↓

Connect the connector to brake warning switch.

PARKING BRAKE SWITCH

INSPECT GROUND CONNECTION
Disconnect connector from parking brake switch.
Is there continuity between terminal 2 of wire harness side connector and ground?

No →
- Open circuit in wire harness between terminal 2 of parking brake switch.
- Ground faulty.

Yes ↓

INSPECT PARKING BRAKE SWITCH OPERATION
Is parking brake switch operation normal?
(See page BE–53)

No → Replace parking brake switch.

Yes ↓

Connect connector to parking brake switch.

ECU

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

Ignition switch turned on.

Is there no voltage between terminal 14 (3) and ground with parking brake lever pulled up.

No → Open circuit in wire harness between terminal 14(3) of ECU and terminal 1 of parking brake switch or brake warning light.

Yes ↓

Is there battery positive voltage between terminal 14 (3) and body ground with parking brake released?

No → Short circuit in wire harness between terminal 14(3) of ECU and terminal 1 of parking brake switch, terminal 1 of brake fluid level warning switch or brake warning light.

Yes ↓

CC ECU faulty.
Replace CC ECU. Then recheck system.

( ): 3VZ–E

G INSPECTION OF CLUTCH SWITCH CIRCUIT

Turn ignition switch off .

CLUTCH SWITCH

INSPECT GROUND CONNECTION
Disconnect connector from clutch switch.
Is there continuity between terminal 2 of wire harness side connector and ground.

No → Open circuit in wire harness between terminal 2 of the clutch switch and ground.

Yes

INSPECT CLUTCH SWITCH OPERATION
Is clutch switch operation normal?
(See page BE–118)

No → Replace clutch switch.

Yes

Connect connector to clutch switch.

ECU

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

INSPECT CLUTCH SWITCH CIRCUIT
Is there continuity between terminal 13 (2)–and ground when clutch pedal is depressed?

No → Open circuit in wire harness between terminal 13 (2) of ECU and terminal 1 of clutch switch.

Yes

CC ECU faulty.
Replace CC ECU. Then recheck system.

( ): 3VZ–E

H INSPECTION OF PARK/NEUTRAL POSITION SWITCH CIRCUIT

Turn ignition switch off.

PARK/NEUTRAL POSITION SWITCH

INSPECT GROUND CONNECTION
Disconnect connector from park/neutral position switch.
Is there continuity between terminal 3 or wire harness side connector and ground?

No → Open circuit in wire harness between terminal 3 of park/neutral position switch and ground.

Yes

INSPECT PARK/NEUTRAL POSITION SWITCH OPERATION
Is park/neutral position switch operation normal?
(See pages AT2–40, AT1–41)

No → Replace park/neutral position switch.

Yes

Connect connector to park/neutral position switch.

ECU

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

INSPECT PARK/NEUTRAL POSITION SWITCH CIRCUIT
Is there continuity between terminal 13 (2) and ground when shifted to “N” and “P” position?

No → Open circuit in wire harness between terminal 13 (2) of ECU and terminal 2 of park/neutral position switch.

Yes

CC ECU faulty.
Replace CC ECU. Then recheck system.

( ) :3VZ–E

I INSPECTION OF VACUUM CIRCUIT (22R–E ENGINE)

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 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 VACUUM SWITCH OPERATION
Is vacuum switch normal?
(See page **BE–118**)

No → Replace vacuum switch.

Yes

VACUUM PUMP

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

No →
- Open circuit in wire harness between terminal 2 of vacuum pump and ground.
- Ground faulty.

Yes

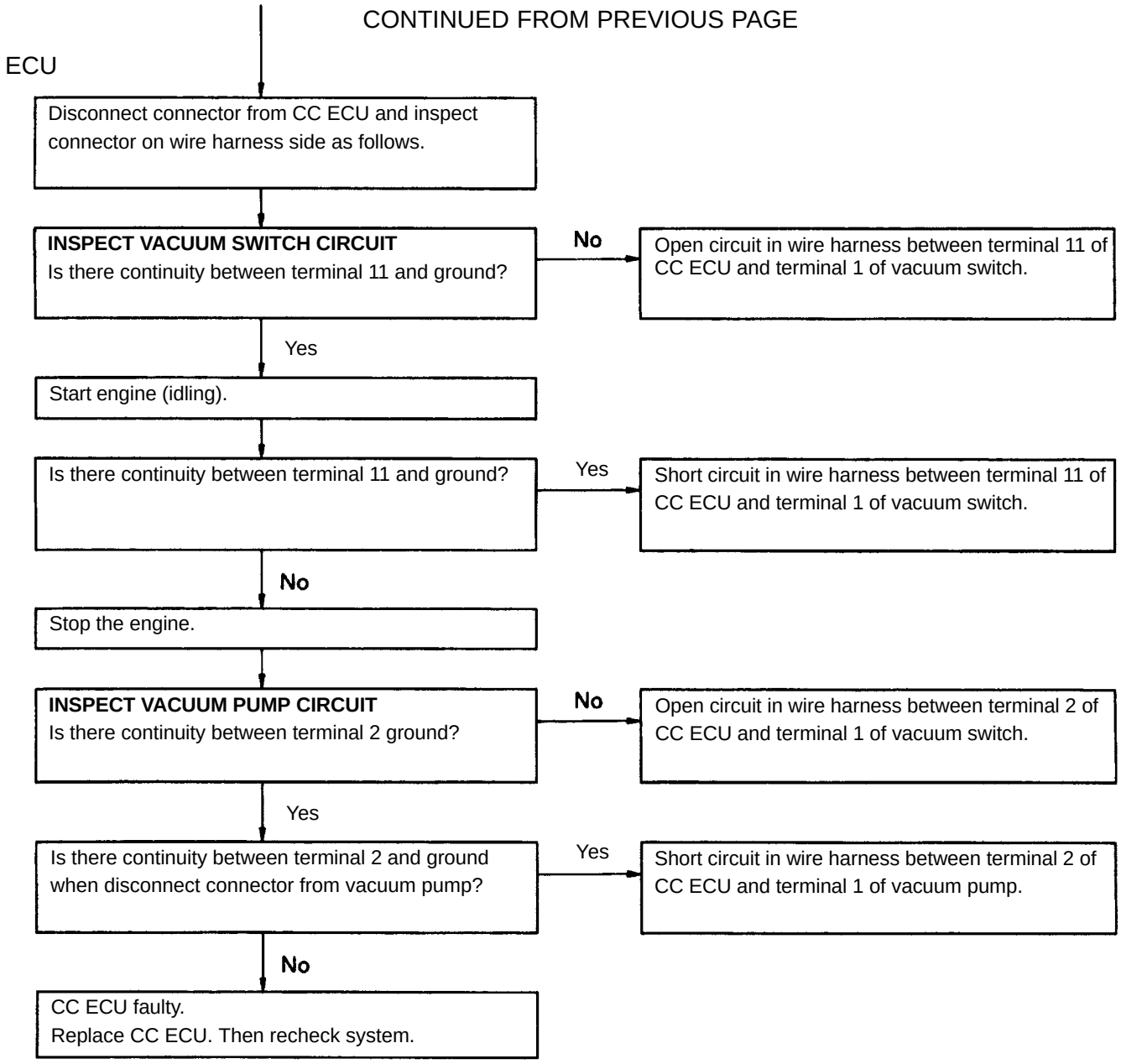
INSPECT VACUUM PUMP OPERATION
Is vacuum pump operation normal?
(See page BE–120)

No → Replace vacuum pump.

Yes

Connect connector to vacuum switch and pump.

CONTINUED ON NEXT PAGE


CONTINUED FROM PREVIOUS PAGE
ECU
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.
INSPECT VACUUM SWITCH CIRCUIT
Is there continuity between terminal 11 and ground?
No
Open circuit in wire harness between terminal 11 of CC ECU and terminal 1 of vacuum switch.
Yes
Start engine (idling).
Is there continuity between terminal 11 and ground?
Yes
Short circuit in wire harness between terminal 11 of CC ECU and terminal 1 of vacuum switch.
No
Stop the engine.
INSPECT VACUUM PUMP CIRCUIT
Is there continuity between terminal 2 ground?
No
Open circuit in wire harness between terminal 2 of CC ECU and terminal 1 of vacuum switch.
Yes
Is there continuity between terminal 2 and ground when disconnect connector from vacuum pump?
Yes
Short circuit in wire harness between terminal 2 of CC ECU and terminal 1 of vacuum pump.
No
CC ECU faulty.
Replace CC ECU. Then recheck system.

J INSPECTION OF ECT SOLENOID CIRCUIT

Start engine (idling).

ECM

Is there battery positive voltage between terminal 6/26 of ECM and ground?

No → Short or open circuit in wire harness between terminal 6I26 of ECM and terminal 22 (9) of CC ECU.

Yes

Is there voltage approx. 5V between terminal 9 (7) of CC ECU and ground 7

No → Short or open circuit in wire harness between terminal 9 (7) of CC ECU and terminal of ECM.

Yes

Stop engine.

CC ECU

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

INSPECT ECT SOLENOID CIRCUIT
Is there continuity between terminal 22 (9) and terminal 6/26 of ECM ?

No → Open circuit in wire harness between terminal 22 (9) of CC ECU and terminal 6/26 of ECM.

Yes

Is resistance value about 11–15Ω between terminal 22 (9) and ground ?

No → Open or short circuit in wire harness between terminal 22 (9) or CC ECU and terminal of ECM or Electronically controlled transmission solenoid (No–2).

Yes

CC ECU faulty.
Replace CC ECU. Then recheck system.

( ): 3VZ–E

K IDL SIGNAL CIRCUIT

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

THROTTLE POSITION SENSOR

INSPECT THROTTLE POSITION SENSOR ADJUSTMENT (See pages AT2–27(A340H), AT1–25 (A340E,F)) Is throttle position sensor adjustment normal?

No → Adjust position sensor position. Then recheck system.

Yes

INSPECT THROTTLE POSITION SENSOR (See page AT–40)
Is throttle position sensor operation normal?

No → Replace throttle position sensor. Then recheck system.

Yes

CC ECU

Connect connector to throttle position sensor.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

INSPECT IDL SIGNAL CIRCUIT
Is there continuity between terminal 23 and ground when acceleration pedal is released?

No → Open circuit in wire harness between terminals 23 of CC ECU and 2 of throttle position sensor.

Yes

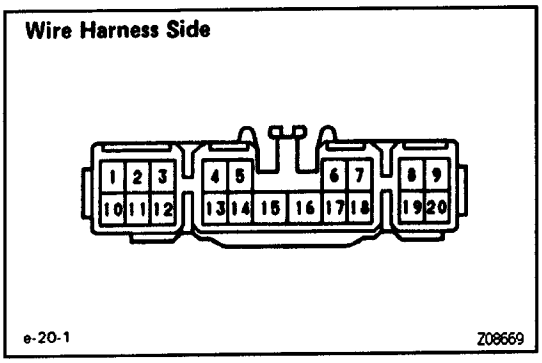
Is there no continuity between terminal 23 and ground when acceleration pedal is depressed?

No → Short circuit in wire harness between terminals 23 of CC ECU and 2 of throttle position sensor.

Yes

Replace CC ECU. Then recheck system.

CC: Cruise Control



CRUISE CONTROL ECU INSPECTION

1. 22R–E

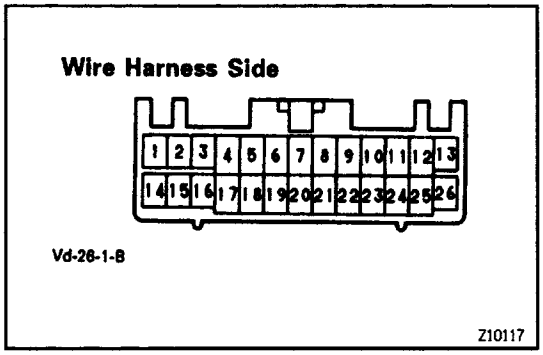
INSPECT ECU CIRCUIT

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 Condition
Data Link Connector 2	Continuity	1 – Ground	Short terminals between "^e" and "Ei"		Continuity
			Released		No continuity
Vacuum pump		2 – Ground	Constant		Continuity *1
Vehicle speed sensor (in combination motor)		8 – Ground	Vehicle moving slowly		1 pulse each 40 cm approx. (15.75 in.)
Vacuum switch		11 – Ground	Vacuum	No vacuum	Continuity
				More then 70 ± 30 mmHg (6.69 ± 1.18 in.Hg 22.66 ± 4.0 kPa)	No continuity
Park/Neutral position switch (AIT)		13 – Ground	Shift position	"N" or "P" position	Continuity
				"L", "2", "D" or "R" position	No continuity
Clutch switch (Mfr)		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. 418 Ω
				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. 198 Ω
				Released	No continuity
Stop light switch and actuator (release valve)		3 – 16	Brake pedal position	Depressed	No continuity
				Released	Approx. 71 Ω
Actuator lcontrol valve)		5 – 16	Constant		Approx. 38 Ω
No. 2 solenoid valve		9 – Ground	Constant		less than 15 Ω
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 switch position	ON	Approx. 5 V or more
				LOCK or 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
Engine signal		20 – Ground	Ignition switch position	ON or ST	Battery positive voltage
				LOCK or ACC	No voltage

* 1 There is resistance in the circuit.

If circuit is not as specified, replace the ECU.



2. 3VZ – E

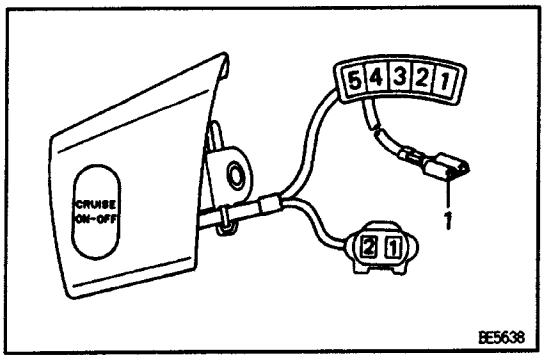
INSPECT ECU CIRCUIT

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

Check for	Measured Item,	Tester connection	Condition		Specified condition
Continuity	Park/Neutral position switch	**2 – ground**	Shift lever position	Nor P	**Continuity**
				L,2,D or R	**No continuity**
	Clutch switch	**2 – ground**	Clutch pedal position	released	**No continuity**
				depressed	**Continuity**
	Parking brake switch	**3 – ground**	Parking brake lever position	released	**No continuity**
				pulled	**Continuity**
	Control switch	**19 – ground**	Main switch position	OFF	**No continuity**
				ON	**Continuity**
	Ground connection	**13 – ground**	Constant		**Continuity**
	Control switch	**18 – ground**	Control switch position	RES/ACC	**68 Ω**
			Control switch position	SET/COAST	**198 Ω**
			Control switch position	CANCEL	**418 Ω**
	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**
	DLC1 Circuit	**8 – ground**	Constant		**No continuity**
			Terminals Tc and E1 connected		**Continuity**
	Throttle position sensor 11DL)	**21 – 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 – 23**	Constant		**Approx. 2 kΩ**
		24 – 25	Actuator arm turned		**Resistance change even**
	Actuator (magnet clutch)	**10 – 26**	Brake pedal position	released	**Approx. 38.5 Ω**
				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**	Broke pedal position	released	**No voltage**
				depressed	**Battery positive voltage**
	No. 2 solenoid	**22 – ground**	Ignition switch position	LOCK or ACC	**No voltage**
				ON	**Battery positive voltage**

* : This circuit include the diode.

If circuit is not as specified, replace the ECU.

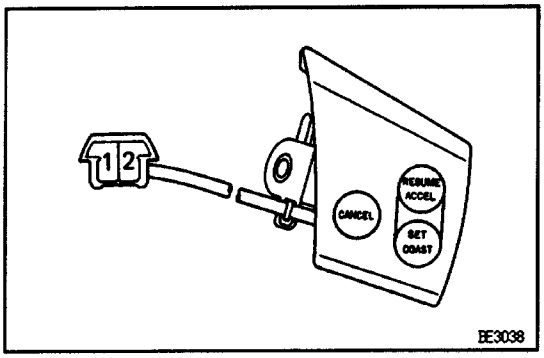


MAIN SWITCH INSPECTION

INSPECT MAIN SWITCH CONTINUITY

Condition	Tester connection to terminal number	Specified condition
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.



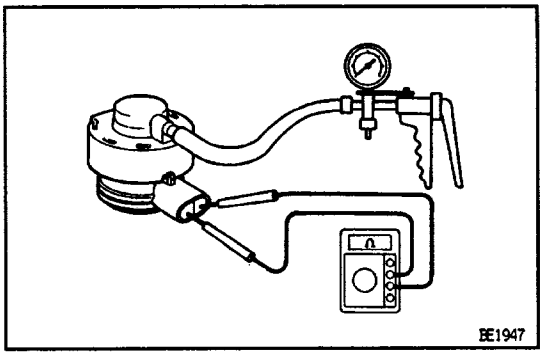
CRUISE CONTROL SWITCH INSPECTION

INSPECT CRUISE CONTROL SWITCH RESISTANCE

Measure the resistance value between terminals 1 and 2.

Switch position	Resistance (Ω)
OFF	**No continuity**
RESUME/ ACCEL	**Approx. 68**
SET/ COAST	**Approx. 198**
CANCEL	**Approx. 418**

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



22R– E

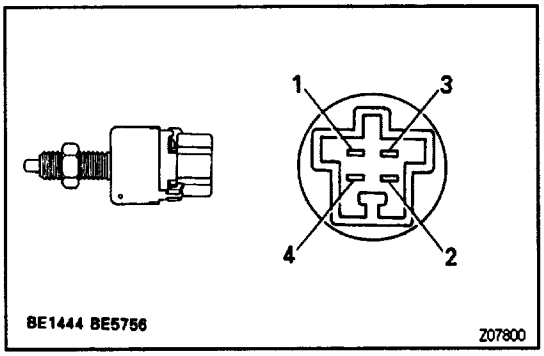
VACUUM SWITCH INSPECTION

INSPECT VACUUM SWITCH OPERATION

(a) Check that there is continuity between terminals with no vacuum.

(b) Check that there is no continuity between terminals with a vacuum of 22.66 ± 4.00 kPa (170 ± 30 mmHg, 6.69 ± 1.18 in.Hg) or above.

If operation is not as specified, replace the switch.

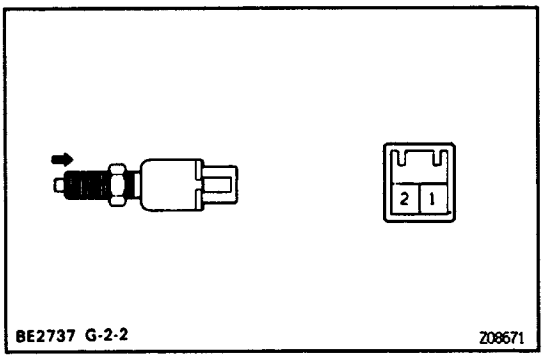


STOP LIGHT SWITCH INSPECTION

INSPECT STOP LIGHT SWITCH CONTINUITY

Switch position	Tester connection to terminal number	Specified continuity
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.



CLUTCH SWITCH INSPECTION

INSPECT CLUTCH SWITCH CONTINUITY

Switch position	Tester connection to terminal number	Specified condition
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

See page BE–53

PARKING BRAKE SWITCH INSPECTION

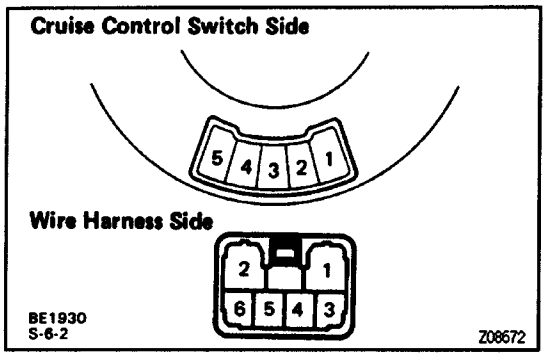
See page BE–53

PARK/ NEUTRAL POSITION SWITCH INSPECTION

See pages AT2–40, AT1–41

SPEED SENSOR INSPECTION

See page BE–48

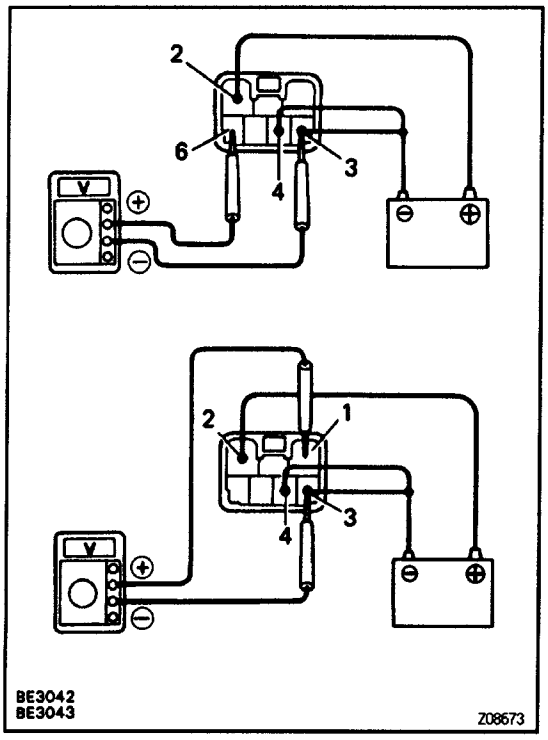


SLIP RING INSPECTION

INSPECT SLIP RING CONTINUITY

Condition	Tester connection to terminal number	Specified condition
Constant	2/5 – 6/6	Continuity
Constant	3/5 – 4/6	Continuity
Constant	4/5 – 5/6	Continuity

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



22R–E

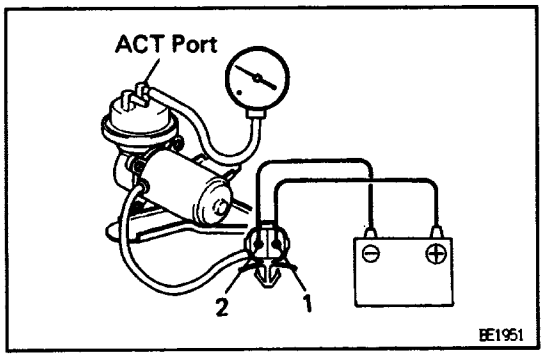
MAIN RELAY INSPECTION

INSPECT MAIN RELAY OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminals 3 and 4.

(b) Connect the positive (+) lead from the voltmeter to terminal 6 and the negative (–) lead to terminal 3, check that there is battery positive voltage.

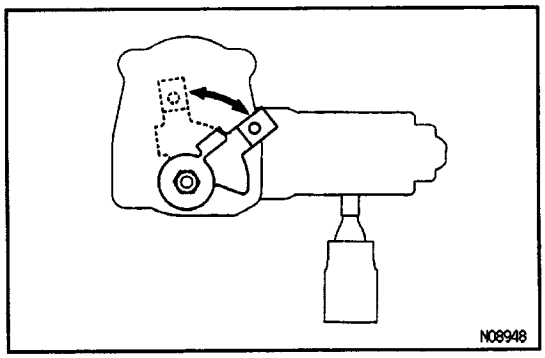
(c) Change the positive (+) lead of the voltmeter to terminal 1, check that there is voltage less than 0.3 V.
If operation is not as specified, replace the relay.



22R–E
VACUUM PUMP INSPECTION

INSPECT VACUUM PUMP OPERATION

(a) Connect a vacuum gauge to the ACT side of the pump.
(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.
(c) 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.

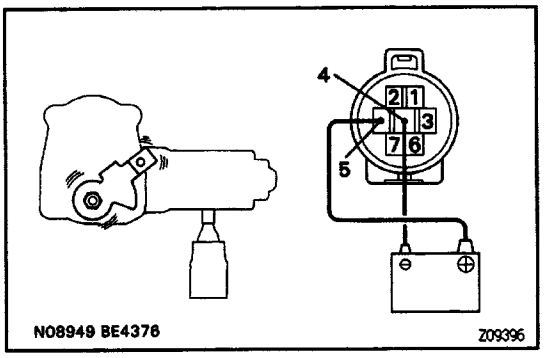


ACTUATOR INSPECTION

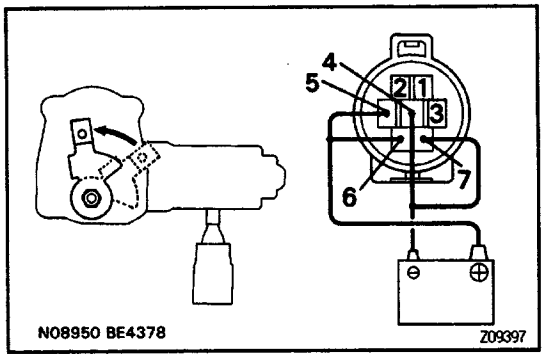
1. INSPECT MAGNETIC CLUTCH

3VZ–E Engine:

(a) Check that the arm can be moved smoothly by hand.

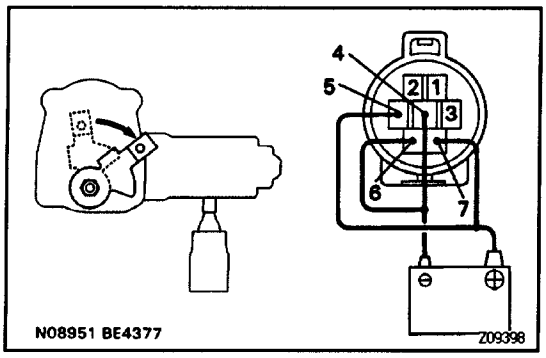


(b) Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 4.
(Magnetic clutch turned ON)
(c) Check that the arm does not moves by hand.



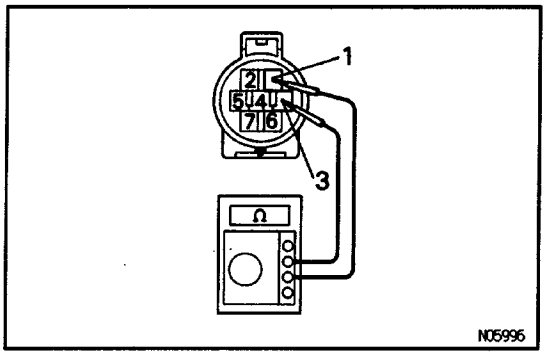
2. INSPECT MOTOR

(a) With the magnetic 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 magnetic 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 closed side.

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

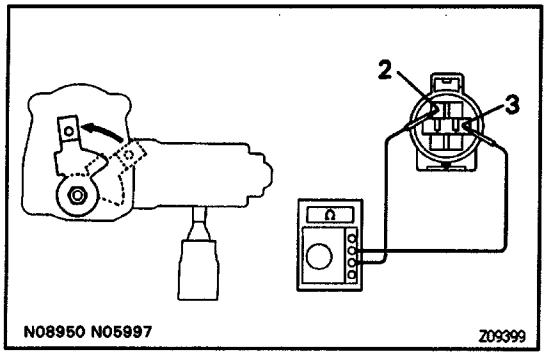


3. INSPECT POSITION SENSOR

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

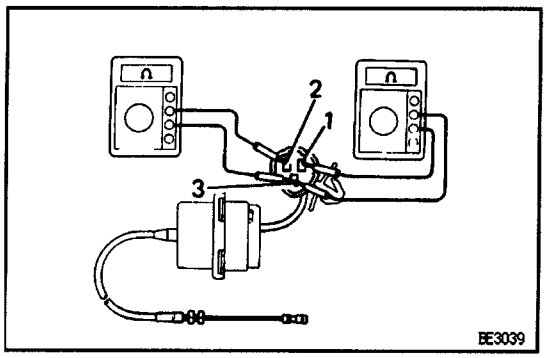
Resistance:

Approx. 2 kΩ



(b) When the arm is moving from the closed to open position, check that resistance between terminal 2 and 3 increases from approx. 0.5 to 1.8 kΩ.

If operation is not as specified, replace the motor.



4. INSPECT ACTUATOR

22R – E Engine:

Resistance

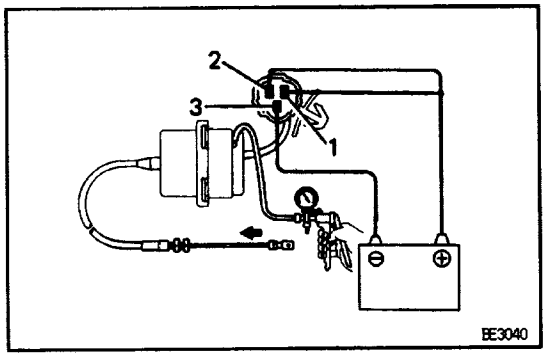
Measure the resistance value between terminals as follows.

Resistance:

1 – 3 Approx. 71Ω

2 – 3 Approx. 38Ω

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



Operation

(a) Connect the positive (+) lead from the battery to terminals 1 and 2, and the negative (–) lead to terminal 3.

(b) 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.

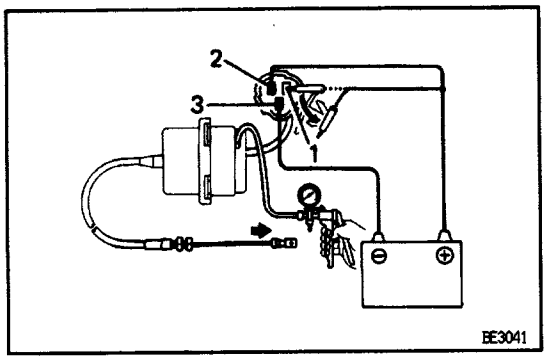
Cable stroke:

Approx.. 38 mm (1.42 in.)

(c) With the vacuum stabilized, check that the control cable does not return.

HINT: As you apply and hold the vacuum with the vacuum pump, the drawn in diaphragm will in some cases return. This does not indicate a malfunction.

Actuator leakage is allowable.



(d) 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.