BODY ELECTRICAL SYSTEM

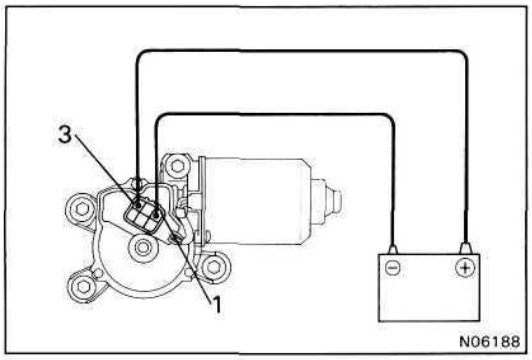
REFER TO FOLLOWING REPAIR MANUALS:

Manual Name	Pub. No.
• Land Cruiser (Hardtop and Canvas Top) Chassis and Body Repair Manual	RM183E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E
• Land Cruiser (Hardtop, Canvas Top and Station Wagon) Chassis and Body Repair Manual Supplement	RM290E

NOTE: The following pages contain only the points which differ from the above listed manuals.

BE

(HARDTOP, CANVAS TOP & STATION WAGON)



WIPER AND WASHER SYSTEM

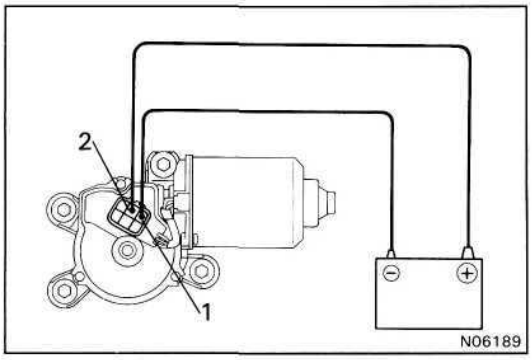
FRONT WIPER MOTOR

FRONT WIPER MOTOR INSPECTION

OPERATION AT LOW SPEED

Connect the positive (+) lead from the battery to terminal 3 and negative (—) lead to terminal 1, check that the motor operates at low speed.

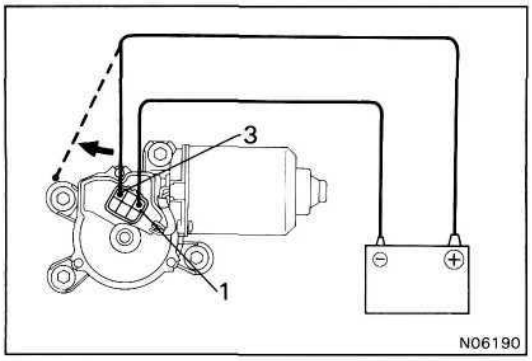
If operation is not as specified, replace the motor.



OPERATION AT HIGH SPEED

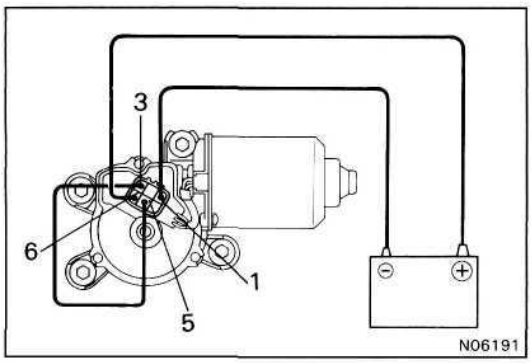
Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, check that the moor operates at high speed.

If operation is not as specified, replace the motor.



OPERATION, STOPPING AT STOP POSITION

(a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 3.



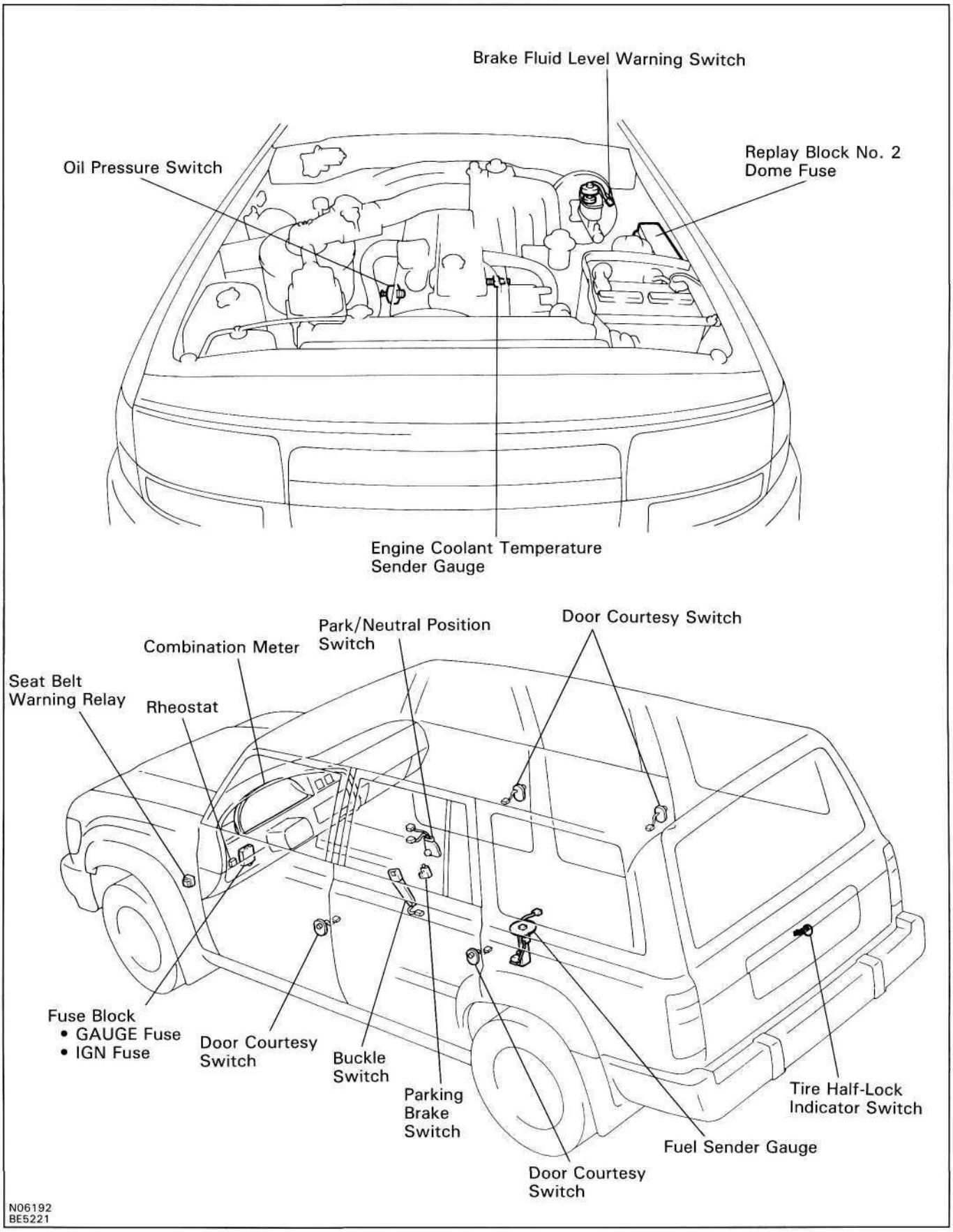
(b) Connect terminal 3 and 5.

(c) Connect the positive (+) lead from the battery to terminal 6 and the negative (—) lead to the terminal 1, check that the motor stops running at the stop position after the motor operates again.

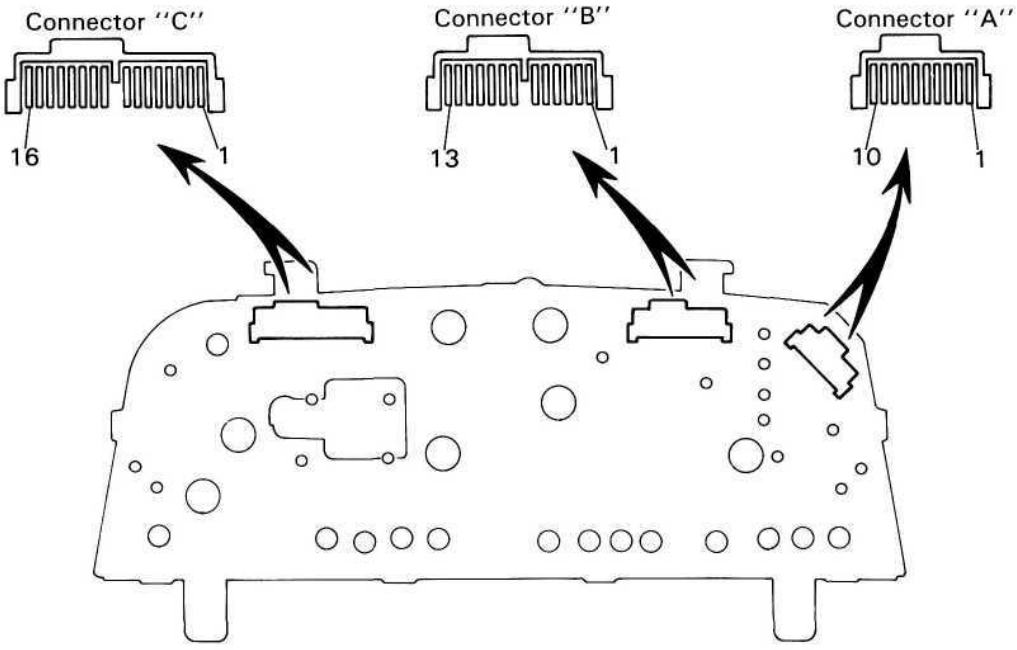
If operation is not as specified, replace the motor.

COMBINATION METER

PARTS LOCATION



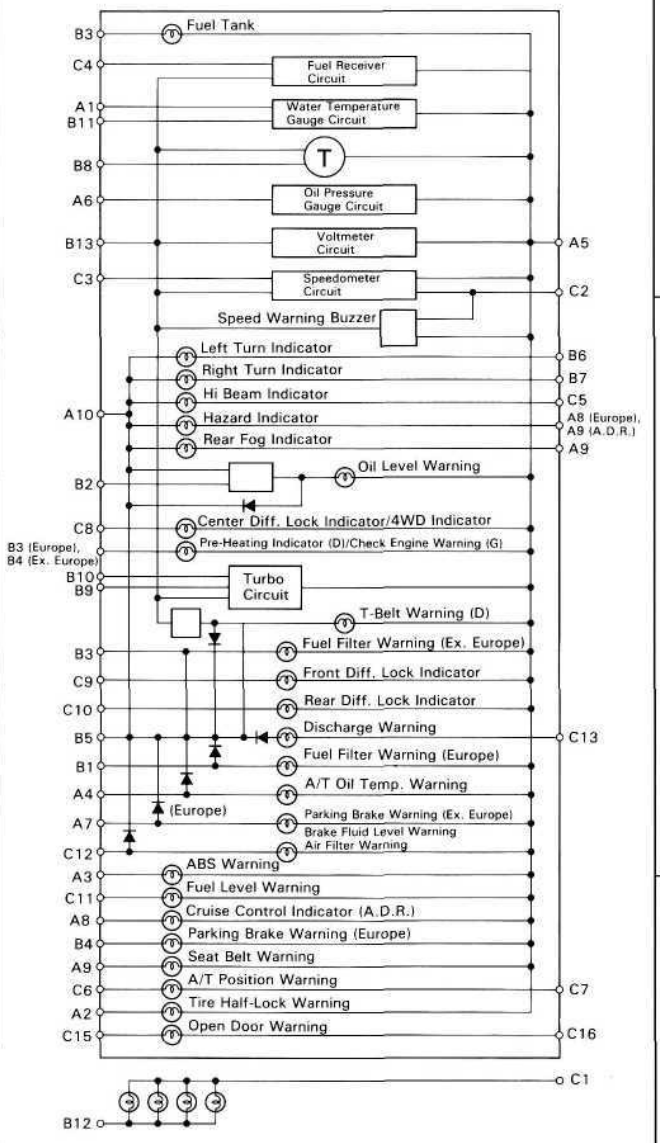
METER CIRCUIT



N06193

METER CIRCUIT

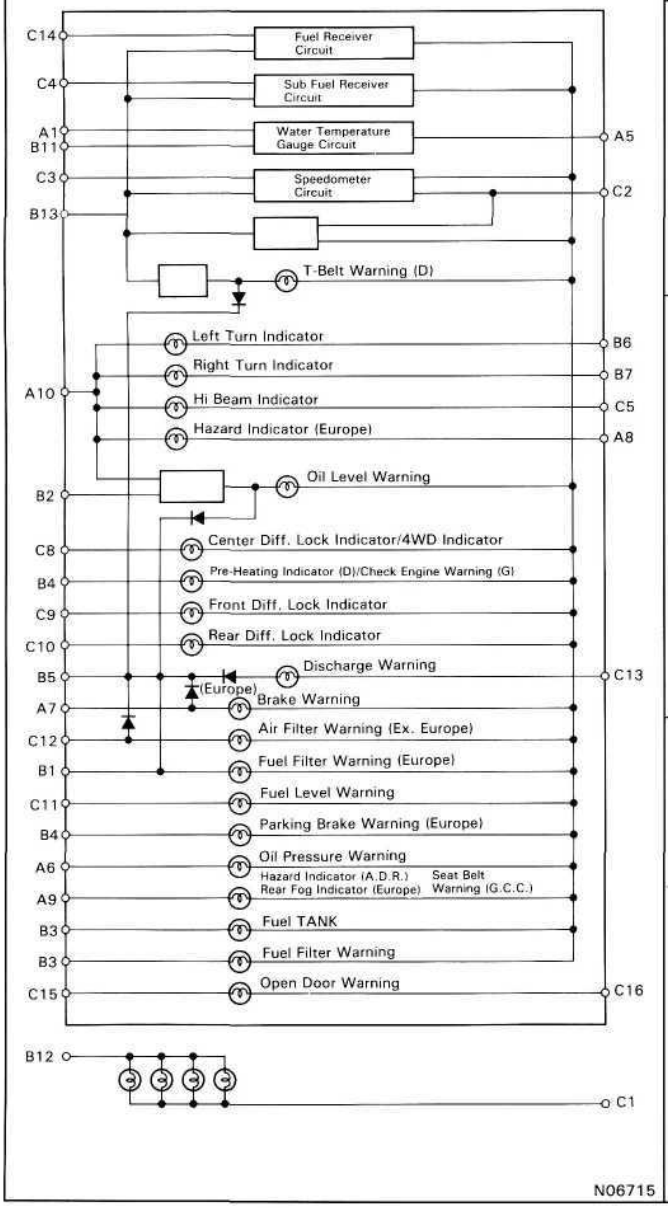
Hi-Grade



No.		Wiring Connector Side
A	1	Ground (TEMP)
	2	Tire Half-Lock Indicator Switch
	3	ABS ECU (Ex. G.C.C.)
	4	A/T Fluid Temperature Sensor
	5	GAUGE Fuse
	6	Low Oil Pressure Sender Gauge
	7	Brake Warning Switch Brake Fluid Level Warning (Europe) Brake Fluid Level Warning and Parking Brake Warning (Ex. Europe)
	8	Hazard Warning Light Switch (Europe) Cruise Control ECU (A.D.R.)
	9	Rear Fog Light Switch (Europe) Hazard Warning Light Switch (A.D.R.) Seat Belt Warning Relay (G.C.C.)
	10	Ground
B	1	Fuel Filter Warning Switch (Europe)
	2	Engine Oil Level Sensor (Ex. G.C.C.)
	3	EFI ECU (Gasoline engine) (Europe) Glow Timer Relay (Diesel engine)(Europe) Fuel Tank ECU (Ex. Europe), Fuel Filter Warning
	4	EFI ECU (Gasoline engine) (Ex. Europe) Glow Timer Relay (Diesel engine)(G.C.C., A.D.R.) Parking Brake Switch (Europe)
	5	Charge Light Relay
	6	Light Control Switch (Left)
	7	Light Control Switch (Right)
	8	Igniter (Gasoline engine), Tacho Pick Sensor (Diesel engine M/T), ECT ECU (Diesel engine A/T)
	9	Turbo Pressure Switch B (Diesel engine)
	10	Turbo Pressure Switch A (Diesel engine)
	11	Water Temperature Gauge
	12	Light Control Rheostat, Illumination (−)
	13	Ground (Gauge)
C	1	TAIL Fuse
	2	Speed Control Unit
	3	Speed Sensor
	5	Headlight Hi-Beam
	6	Neutral Start Switch (−)
	7	Neutral Start Switch (+)
	8	Center Diff. Lock Indicator Switch 4WD Indicator Switch (G.C.C., A.D.R.)
	9	Front Diff. Lock Indicator Switch
	10	Rear Diff. Lock Indicator Switch
	11	Fuel Level Warning Switch
	12	Air Filter Warning Switch
	13	IGN Fuse
	14	Fuel Sender Gauge
	15	Door Courtesy Switch
	16	Dome Fuse

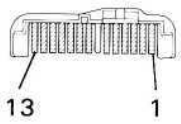
METER CIRCUIT

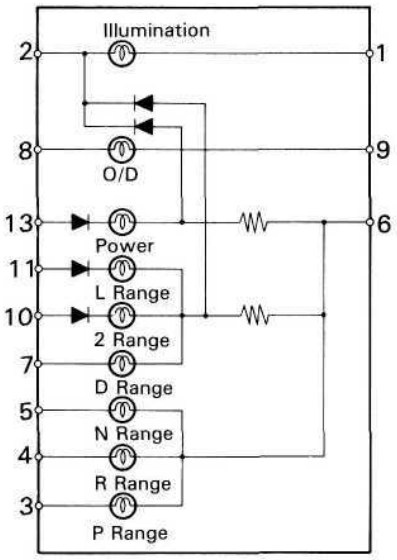
Lo-Grade



No.		Wiring Connector Side
A	1	Ground (TEMP)
	5	GAUGE Fuse
	6	Oil Pressure Switch
	7	Brake Warning Switch
	8	Hazard Warning Switch (Europe)
	9	Hazard Warning Switch (A.D.R.) Rear Fog Light Switch (Europe) Seat Belt Warning Relay (G.C.C.)
	10	Ground
B	1	Fuel Filter Warning Switch (Europe)
	2	Engine Oil Level Sensor (Ex. G.C.C.)
	3	Fuel Filter Warning (Ex. Europe) Glow Timer Relay (Europe), Fuel Tank (A.D.R.)
	4	EFI ECU (Gasoline)(A.D.R.) Glow Timer Relay (Ex. Europe)
		Parking Brake Switch (Europe)
	5	Charge Light Relay
	6	Light Control Switch (Left)
	7	Light Control Switch (Right)
	11	Engine Coolant Temperature Gauge
	12	Light Control Rheostat, Illumination (−)
	13	Ground (Gauge)
C	1	TAIL Fuse
	2	Speed Control Unit
	3	Speed Sensor
	4	Sub Fuel Sender Gauge (Ex. Europe)
	5	Headlight Hi-Beam
	8	Center Diff. Lock Indicator Switch (Europe) 4WD Indicator Switch (Ex. Europe)
	9	Front Diff. Lock Indicator Switch
	10	Rear Diff. Lock Indicator Switch
	11	Fuel Level Warning Switch
	12	Air Filter Warning Switch (Ex. Europe)
	13	IGN Fuse
	14	Fuel Sender Gauge
	15	Door Courtesy Switch
	16	Dome Fuse

- **SHIFT POSITION INDICATOR**





No.	Wiring Connector Side
1	Ground
2	TAIL Fuse
3	Neutral Start Switch ''P''
4	Neutral Start Switch ''R''
5	Neutral Start Switch ''N''
6	Ground
7	Neutral Start Switch ''D''
8	GAUGE Fuse
9	O/D Switch
10	Neutral Start Switch ''N''
11	Neutral Start Switch ''L''
13	ECT SELECT Switch

N03970
N06733

TROUBLESHOOTING

The table below will be useful for you in troubleshooting these electrical problems. The most likely causes of the malfunction are shown in the order of their probability. Inspect each part in the order shown, and replace the part when it is found to be faulty.

Trouble	Part name	See page
Combination meter do not operate.	1. GAUGE Fuse 2. Wire Harness	– –
Speedometer does not operate.	1. Speed Sensor	BE-10
Tachometer does not operate.	1. Tachometer 2. Igniter (Tacho pick sensor, ECT ECU) 3. Wire Harness	BE-11 – –
Fuel gauge does not operate.	1. Receiver Gauge 2. Sender Gauge 3. Wire Harness	BE-11 BE-12 –
Fuel level warning light does not light up.	1. Bulb 2. Fuel Level Warning Switch 3. Wire Harness	– BE-12 –
Water temperature gauge does not operate.	1. Receiver Gauge 2. Sender Gauge 3. Wire Harness	BE-13 BE-13 –
Oil pressure gauge does not operate.	1. Receiver Gauge 2. Sender Gauge 3. Wire Harness	BE-15 BE-15 –
Voltmeter does not operate.	1. Receiver Gauge 2. Wire Harness	BE-14 –
Brake warning light does not light up.	1. Bulb 2. Brake Fluid Level Warning Switch 3. Parking Brake Switch 4. Wire Harness	– BE-16 BE-16 –
Seat belt warning light does not light up.	1. Bulb 2. Seat Belt Warning Switch 3. Seat Belt Warning Relay 4. Wire Harness	– BE-17 BE-17 –
Open door warning light does not light up.	1. Bulb 2. Door Courtesy Switch 3. Wire Harness	– BE-16 –
Tire half-lock warning light does not light up.	1. Bulb 2. Tire Half-Lock Indicator Switch 3. Wire Harness	– BE-18 –

Trouble	Part name	See page
ABS warning light does not light up.	1. Bulb 2. ABS ECU 3. Wire Harness	– – –
Meter illumination control system does not operate.	1. Bulb 2. Light Control Rheostat 3. Wire Harness	– BE-19 –
Shift position indicator light does not light up.	1. Bulb 2. Neutral Position Switch 3. Wire Harness	– – –
Engine oil level warning light does not light up.	1. Bulb 2. Engine Oil Level Sensor 3. Wire Harness	– BE-19 –

(km/h) A.D.R., General

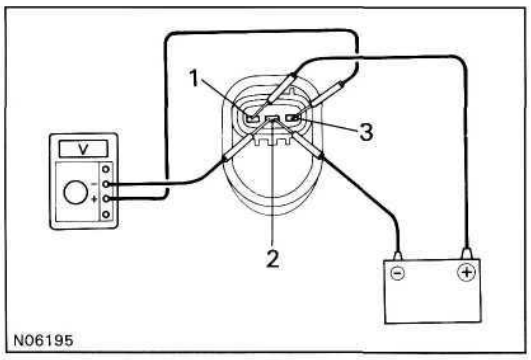
Standard indication	Allowable range
40	36 – 44
60	54 – 66
80	72 – 88
100	90 – 110
120	108 – 132
140	126 – 154
160	144 – 176

(km/h) Europe, G.C.C.

Standard indication	Allowable range
20	20 – 26
40	40 – 48
60	60 – 70
80	80 – 92
100	100 – 114
120	120 – 136
140	140 – 158
160	160 – 180

(mph) General, Europe

Standard indication	Allowable range
20	20 – 24.5
40	40 – 46.5
60	60 – 68.5
80	80 – 90.5
100	100 – 112.5



SPEEDOMETER SYSTEM

INSPECT SPEEDOMETER (ON-VEHICLE)

(a) Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.

HINT: Tire wear and tire over or under inflation will increase the indication error.

(b) Check the speedometer for pointer vibration and abnormal noise.

HINT: Pointer vibration can be caused by a loose speedometer cable.

SPEED SENSOR INSPECTION

(a) Connect the positive (+) lead from battery to terminal 1 and negative (—) lead to terminal 2.

(b) Connect the positive (+) lead from tester to terminal 3 and negative (—) lead to terminal 2.

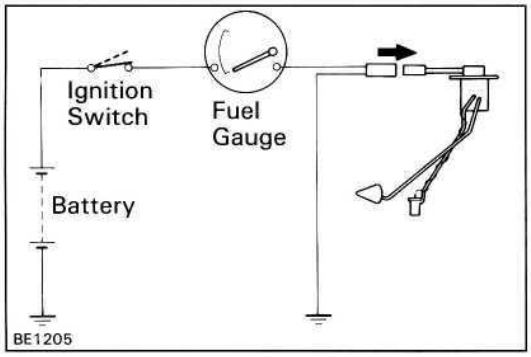
(c) Revolve shaft.

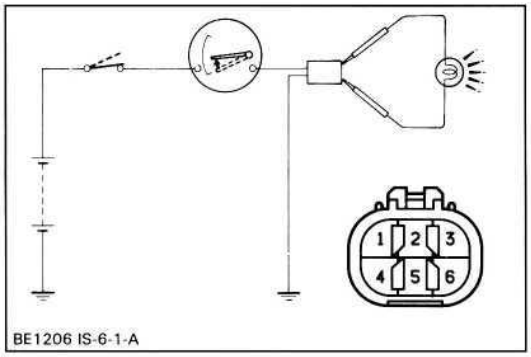
(d) Check that there is voltage changer from approx. 0 V to 11 V or more between terminal 3 and 2.

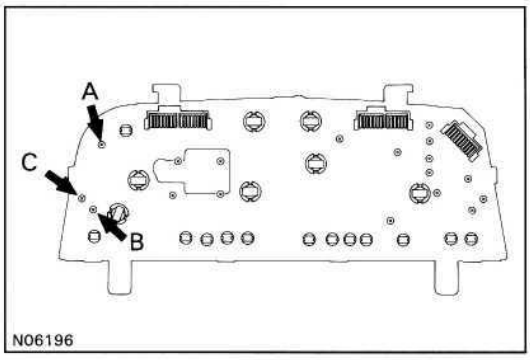
HINT: The voltage change should be 20 times per each revolution of the speed sensor shaft.

If operation is not as specified, replace the sensor.

DC 13.5 V 20°C (68°F) rpm	
Standard Indication	Allowable range
700	630 – 770
1,000	900 – 1,100
2,000	1,875 – 2,125
3,000	2,850 – 3,150
4,000	3,850 – 4,150
5,000	4,850 – 5,150







TACHOMETER SYSTEM

TACHOMETER INSPECTION

INSPECT TACHOMETER (ON-VEHICLE)

(a) Connect a tune-up test tachometer, and start the engine.

NOTICE:

- **Reversing the connection of the tachometer will damage the transistors and diodes inside.**
- **When removing or installing the tachometer, be careful not to drop or subject it to heavy shocks.**

(b) Compare the tester and tachometer indications.

If error is excessive, replace the tachometer.

FUEL GAUGE SYSTEM

FUEL RECEIVER GAUGE INSPECTION

OPERATION

(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.

(c) Connect terminals 4 and 5 on the wire harness side connector through a 3.4 watts test bulb.

(d) Turn the ignition switch ON, check that the bulb lights up and the receiver gauge needle moves towards the full side.

HINT: Because of the silicon oil in the gauge, it will take a short time for needle to stabilize.

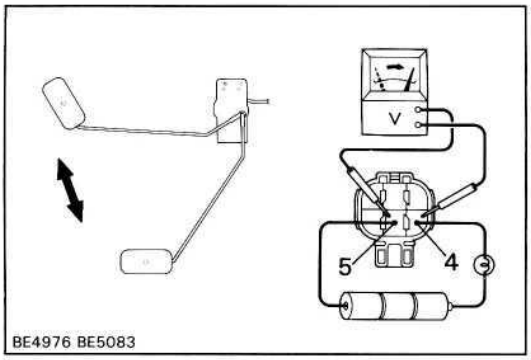
If operation is not as specified, inspect the receiver gauge resistance.

RESISTANCE

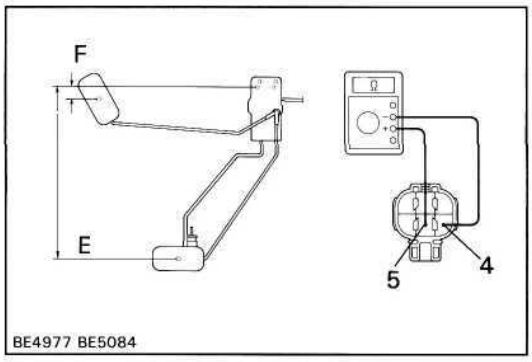
Measure the resistance between terminals.

Between terminals	Resistance (Ω)
A – B	85.5 – 105.5
A – C	126 – 150
C – B	*90 – 110
*: Include voltmeter resistance.	

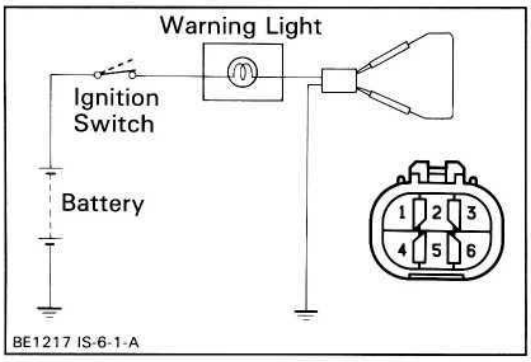
If resistance value is not as specified, replace the receiver gauge.



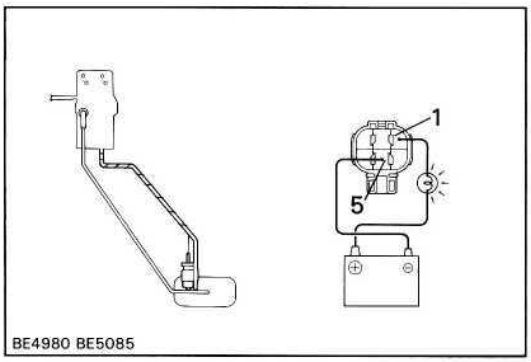
BE4976 BE5083



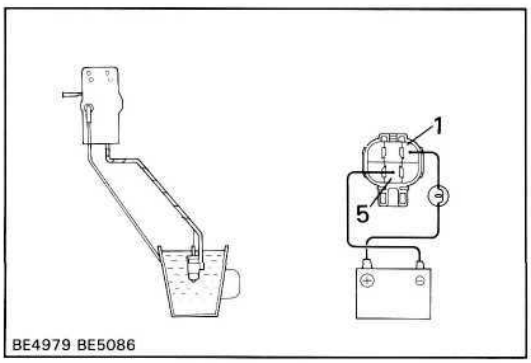
BE4977 BE5084



BE1217 IS-6-1-A



BE4980 BE5085



BE4979 BE5086

FUEL SENDER GAUGE INSPECTION

OPERATION

(a) Connect a series of three 1.5 volts dry cell batteries.

(b) Connect the positive (+) lead from the dry cell batteries to terminal 4 through a 3.4 watts test bulb and the negative (—) lead to terminal 5.

(c) Connect the positive (+) lead from the voltmeter to terminal 4 and the negative (—) lead to terminal 5.

(d) Check that the voltage rises as the float is moved from the full to empty position.

RESISTANCE

Measure the resistance between terminals 4 and 5.

Float position mm (in.)	Resistance (Ω)
F approx. 15 (0.59)	approx. 3
E approx. 200 (7.87)	approx. 110

If resistance value is not as specified, replace the sender gauge.

FUEL LEVEL WARNING SYSTEM

INSPECT WARNING LIGHT

(a) Disconnect the connector from the sender gauge.

(b) Connect terminals 1 and 5 on the wire harness side connector.

(c) Turn the ignition switch ON, check that the warning light lights up.

If the warning light does not light up, test the bulb.

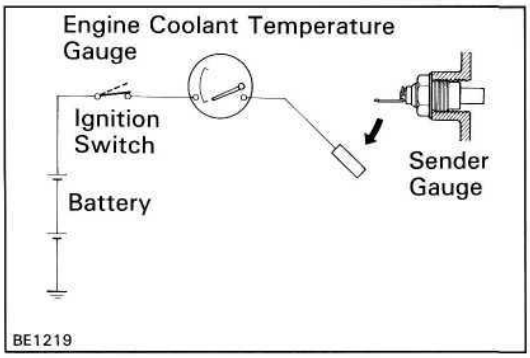
INSPECT WARNING SWITCH

(a) Apply battery voltage between terminals 1 and 5 through a 3.4 watts test bulb, check that the bulb lights up.

HINT: It will take a short time for the bulb to light up.

(b) Submerge the switch in fuel, check that the bulb goes out.

If operation is not specified, replace the sender gauge.



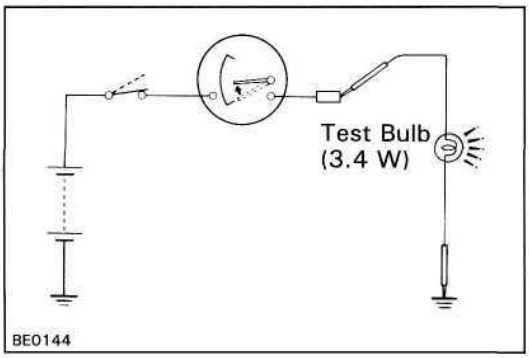
WATER TEMPERATURE GAUGE SYSTEM

WATER TEMPERATURE RECEIVER GAUGE INSPECTION

OPERATION

(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON, check that the receiver gauge needle indicates COOL.

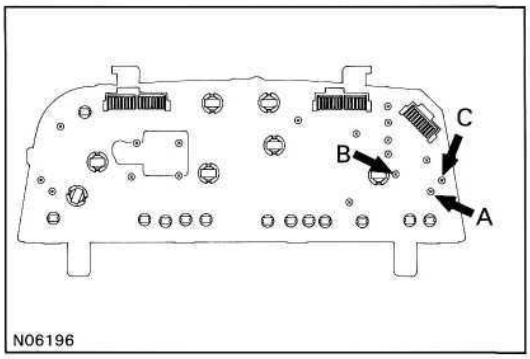


(c) Ground terminal on the wire harness side connector through a 3.4 watts test bulb.

(d) Turn the ignition switch ON, check that the bulb lights up and the receiver gauge needle moves to the hot side.

If operation is as specified, replace the sender gauge. Then recheck the system.

If operation is not as specified, measure the receiver gauge resistance.



RESISTANCE

Measure the resistance between terminals.

Between terminals	Resistance (Ω)
A – B	71 – 79
A – C	117 – 141
B – C	185 – 215

HINT: Connect the test leads so that the current from the ohmmeter can flow according to the above order. This circuit include the diode.

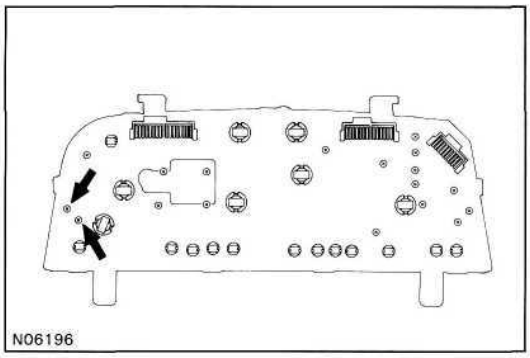
If resistance value is not as specified, replace the receiver gauge.

VOLTMETER SYSTEM

INSPECT VOLTMETER (ON-VEHICLE)

Compare the tester and voltmeter indications.

If error is excessive, replace the voltmeter.



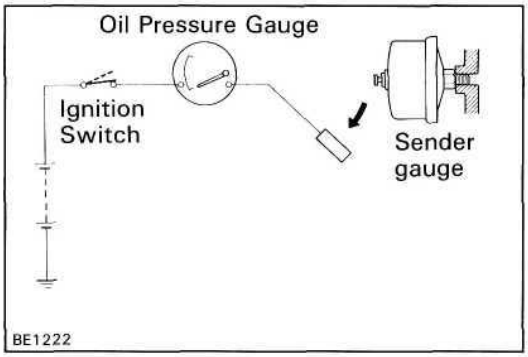
RESISTANCE

Measure the receiver gauge resistance between terminals.

Resistance: 90 - 110 Q

If resistance value is not as specified, replace the receiver gauge.

HINT: This resistance include fuel receiver gauge resistance.



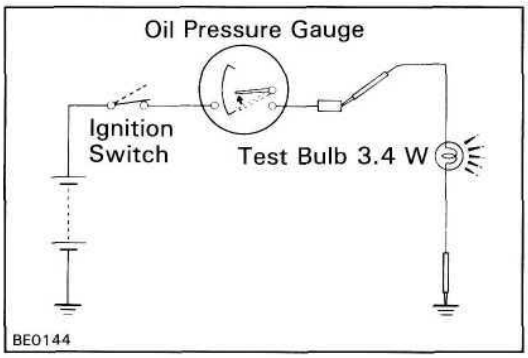
OIL PRESSURE GAUGE SYSTEM

OIL PRESSURE RECEIVER GAUGE INSPECTION

OPERATION

(a) Disconnect the connector from the sender gauge.

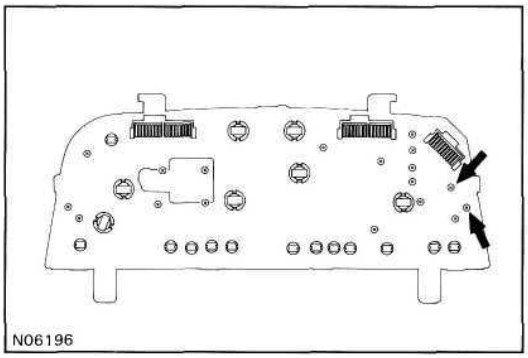
(b) Turn the ignition switch ON, check that the receiver gauge needle indicates LOW.



(c) Ground terminal on the wire harness side through a 3.4 W test bulb.

(d) Turn the ignition switch ON, check that the bulb lights up and the receiver gauge needle, moves to the high side.

If operation is not as specified, measure the receiver gauge resistance.

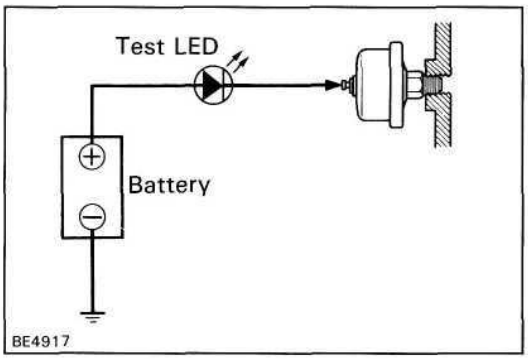


RESISTANCE

Measure the receiver gauge resistance between terminals.

Resistance: 22 - 28 Q

If resistance value is not as specified, replace the receiver gauge.



OIL PRESSURE SENDER GAUGE INSPECTION

INSPECT SENDER GAUGE

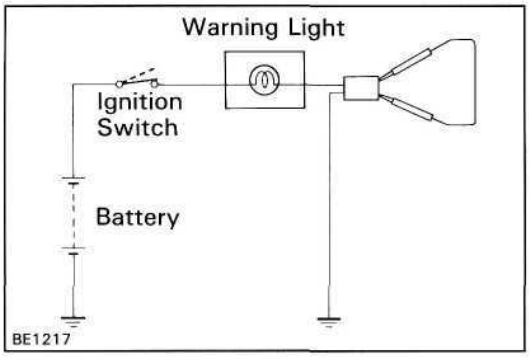
(a) Disconnect the connector from the sender gauge.

(b) Apply battery voltage to the sender gauge terminal through a test LED.

(c) Check that the bulb does not light when the engine is stopped.

(d) Check that the LED flashes when the engine is running. The number of flashed should vary with engine speed.

If operation is not as specified, replace the sender gauge.



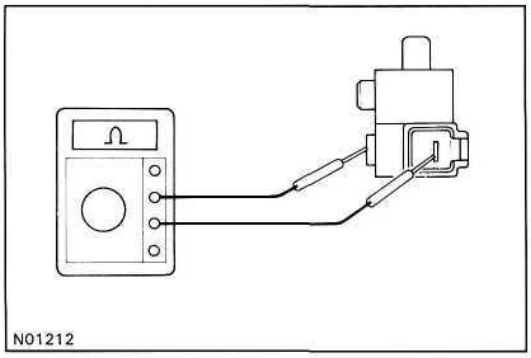
BRAKE WARNING SYSTEM

BRAKE WARNING LIGHT INSPECTION
INSPECT WARNING LIGHT

(a) Disconnect the connectors from the level warning switch, parking brake switch.

(b) Connect terminals on the wire harness side connector of the level warning switch connector.

(c) Turn the ignition switch ON, check that the warning light lights up.

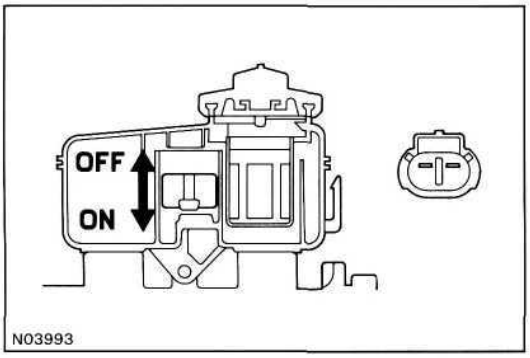


PARKING BRAKE SWITCH INSPECTION
INSPECT SWITCH

(a) Check that there is continuity between terminal and the switch set nut with switch pin released, (parking brake lever pulled up)

(b) Check that there is no continuity between terminal and the switch set nut with switch pin pushed in. (parking brake lever released)

If operation is not as specified, replace the switch.



BRAKE FLUID LEVEL WARNING SWITCH INSPECTION
INSPECT SWITCH

(a) Remove the reservoir tank cap and strainer.

(b) Disconnect the connector.

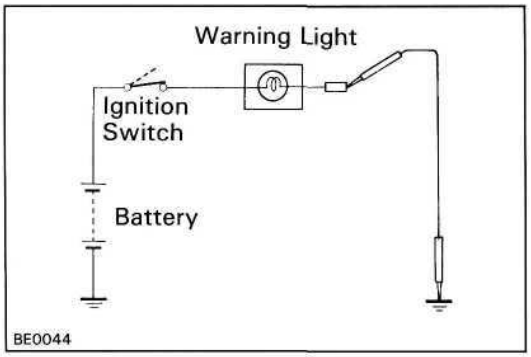
(c) Check that there is no continuity between terminals with the switch OFF (float up).

(d) Use syphon, etc. to take fluid out of the reservoir tank.

(e) Check that there is continuity between terminals with the switch ON (float down).

(f) Pour the fluid back in the reservoir tank.

If operation is not as specified, replace the switch.



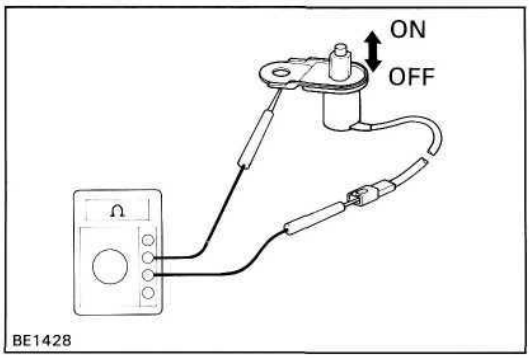
OPEN DOOR WARNING SYSTEM

OPEN DOOR WARNING INSPECTION
INSPECT WARNING LIGHT

(a) Disconnect the connector form the door courtesy switch and ground terminal on the wire harness side connector.

(b) Turn the ignition switch ON, check that the warning light lights up.

If the warning light does not light up, test the bulb.

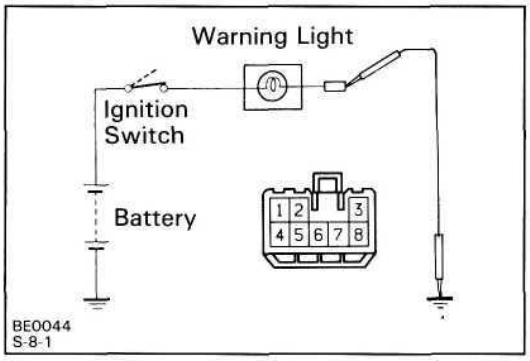


DOOR COURTESY SWITCH INSPECTION
INSPECT COURTESY SWITCH

(a) Check that there is continuity between terminal and the switch body with the ON (switch pin released: opened door).

(b) Check that there is no continuity between terminal and the switch body with the OFF (switch pin pushed in: closed door).

If operation is not as specified, replace the switch.



SEAT BELT WARNING SYSTEM

SEAT BELT WARNING INSPECTION

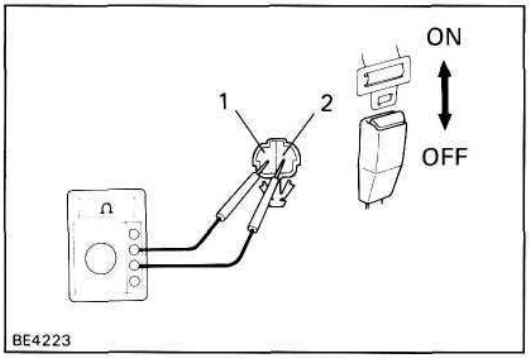
INSPECT WARNING LIGHT

(a) Disconnect the connector from the seat belt warning relay.

(b) Ground terminal 2 on the wire harness side connector.

(c) Turn the ignition switch ON, check that the warning light lights up.

If the warning light does not light, test the bulb.



SEAT BELT BUCKLE SWITCH INSPECTION

INSPECT SWITCH

(a) Check that there is no continuity between terminals with the switch ON (belt unfastened).

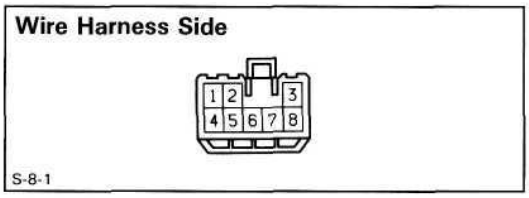
(b) Check that there is continuity between terminals with the switch OFF (belt fastened).

If operation is not as specified, replace the seat belt inner.

DOOR COURTESY SWITCH

DOOR COURTESY SWITCH INSPECTION

See page BE-16



SEAT BELT WARNING RELAY INSPECTION

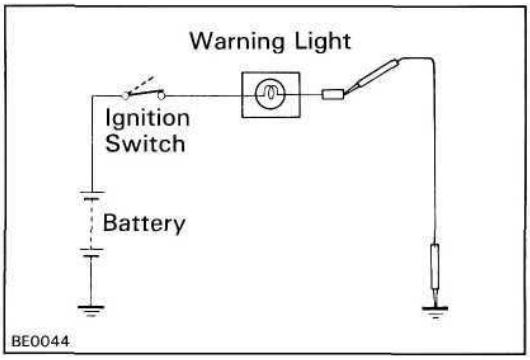
RELAY CIRCUIT

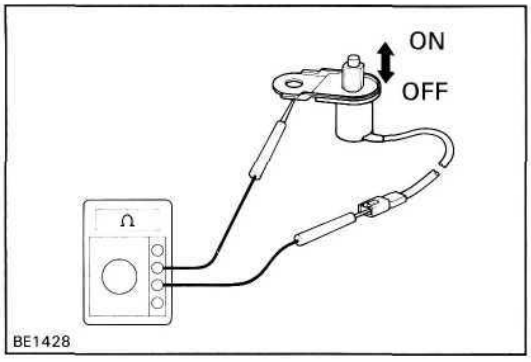
Disconnect the connector from the relay and inspect the connector on the wire harness side as shown in the chart.

Check for	Tester connection	Condition		Specified value
Voltage	5 – Ground	Ignition switch position	ON	Battery voltage
			LOCK or ACC	No voltage
	1 – Ground	Constant		Battery voltage

Continuity	3 – Ground	Driver's door	Open	Continuity
			Close	No continuity
	4 – Ground	Driver's seat belt	Fasten	Continuity
			Unfasten	No continuity
	7 – Ground	Ignition key	Set	Continuity
			Remove	No continuity
	6 – Ground	Constant		Continuity

If circuit is as specified, try another relay.





TIRE HALF-LOCK WARNING SYSTEM

TIRE HALF-LOCK WARNING INSPECTION

INSPECT WARNING LIGHT

(a) Disconnect the connector from the door courtesy switch and ground terminal on the wire harness side connector.

(b) Turn the ignition switch ON, check that the warning light lights up.

If the warning light does not light up, test the bulb.

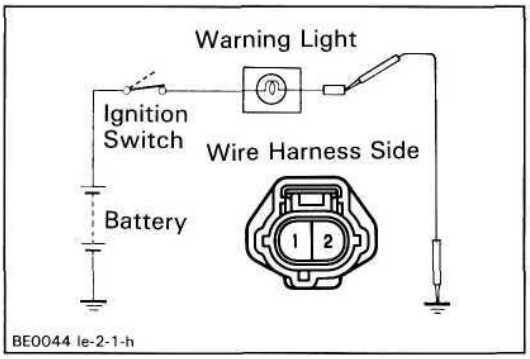
TIRE HALF-LOCK INDICATOR SWITCH INSPECTION

INSPECT SWITCH

(a) Check that there is continuity between terminal and the switch body with the ON (switch pin released: opened door).

(b) Check that there is no continuity between terminal and the switch body with the OFF (switch pin pushed in: closed door).

If operation is not as specified, replace the switch.



ENGINE OIL LEVEL WARNING SYSTEM

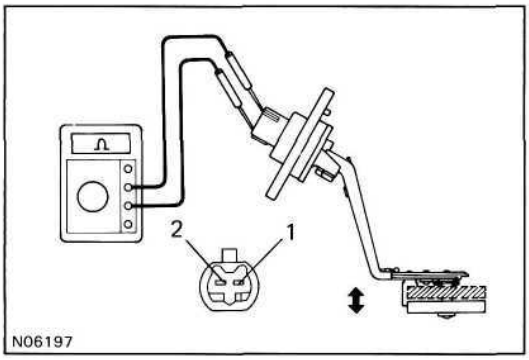
INSPECT WARNING LIGHT

(a) Disconnect the connector from the engine oil level sensor.

(b) Ground terminal 2 on the wire harness side connector.

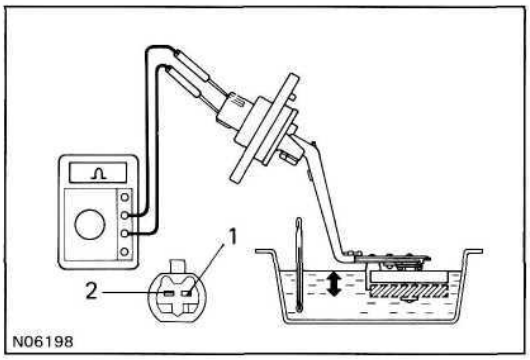
(c) Turn the ignition switch ON, check that the warning light lights up.

If the warning light does not light up, test the bulb.



INSPECT ENGINE OIL LEVEL SENSOR

(a) Check that there is continuity between terminals with the switch each position.

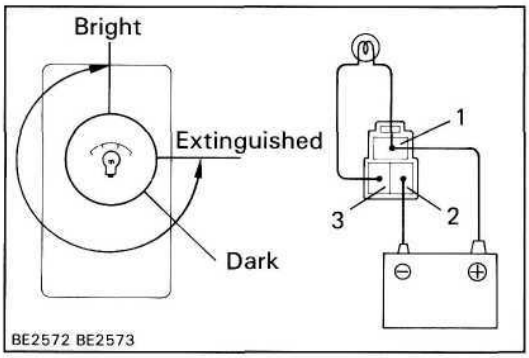


(b) Heat the switch to above 60°C (140°F) in an oil bath.

(c) Check that there is continuity between terminals with the switch ON (float up).

(d) Check that there is no continuity between terminals with the switch OFF (float down).

If operation is not as specified, replace the sensor.



METER ILLUMINATION CONTROL SYSTEM

INSPECT LIGHT CONTROL RHEOSTAT

(a) Connect terminals 1 and 3 through a 3.4 watts test bulb.

(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (—) lead to terminal 2.

(c) Turn the rheostat knob to fully counterclockwise, check that the test bulb goes out.

(d) Gradually turn the rheostat knob to clockwise, check that the test bulb brightness changes from dark to bright.

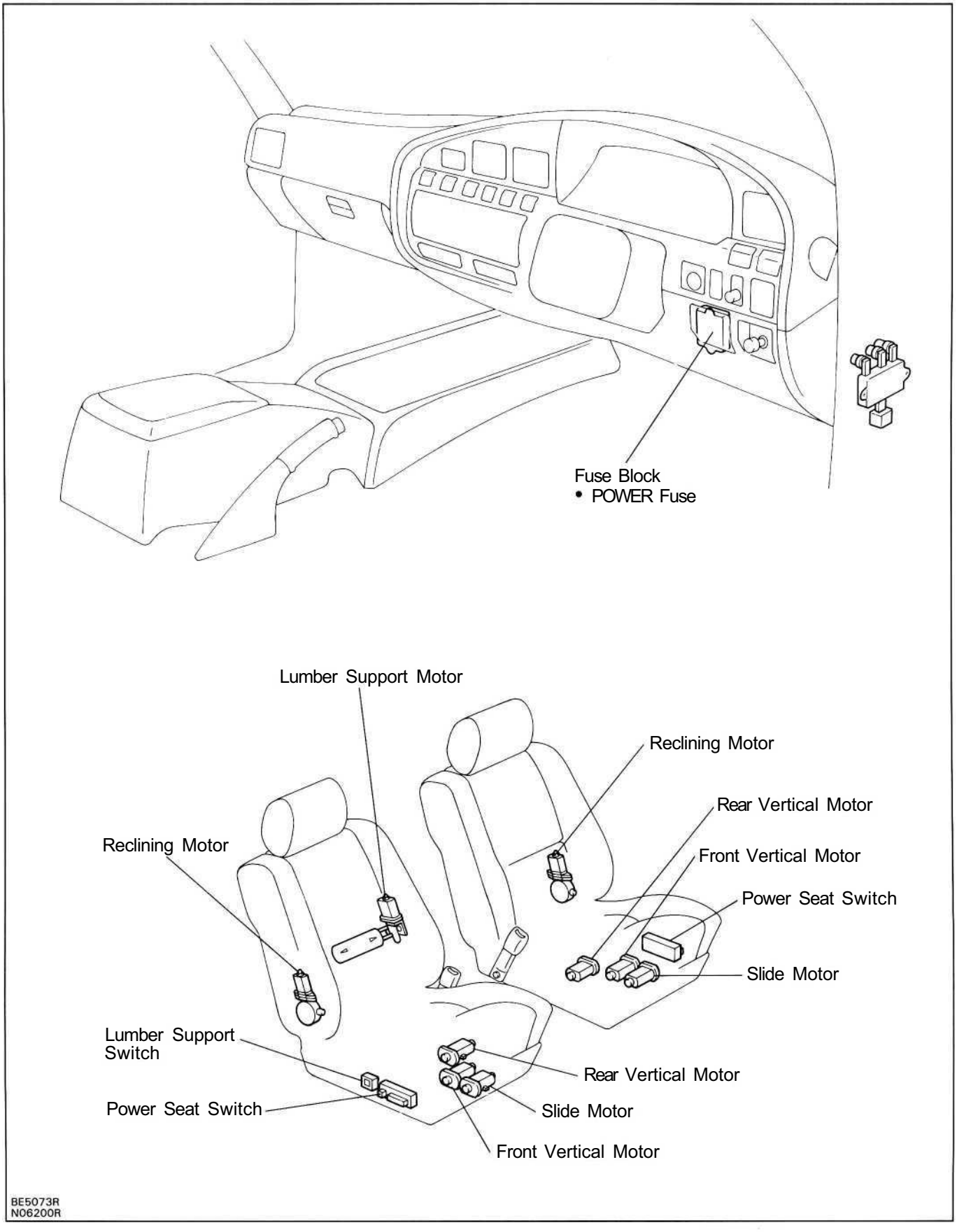
If operation is not as specified, replace the rheostat.

HINT: Illumination lights with adjustable brightness.

- Cigarette Lighter
- Ash Receptacle
- Antenna Switch
- Defogger Switch
- Headlight Cleaner Switch
- Audio
- A/C Control Assembly
- Center Diff. Lock Switch
- Hazard Warning Light Switch
- Shift Lever

POWER SEAT CONTROL SYSTEM

PARTS LOCATION



TROUBLESHOOTING

The table below will be useful for you in troubleshooting these electrical problems. The most likely causes of the malfunction are shown in the order of their probability. Inspect each part in the order shown, and replace the part when it is found to be faulty.

Trouble	Part name	See page
Power seat does not operate. (Door lock does not operate.)	1. FL AM1 2. POWER Fuse 3. Wire Harness 4. Power Seat Switch (D) 5. Power Seat Switch (P)	– – – BE-23 BE-24
Power seat does not operate. (Door lock is normal.)	1. POWER Fuse 2. Wire Harness 3. Power Seat Switch (D) 4. Power Seat Switch (P)	– – BE-23 BE-24
Driver's seat does not operate.	1. Power Seat Switch (D) 2. Wire Harness	BE-23 –
Passenger's seat does not operate.	1. Power Seat Switch (P) 2. Wire Harness	BE-24 –
''Slide operation'' does not operate.	1. Power Seat Switch (D) 2. Power Seat Switch (P) 3. Wire Harness	BE-23 BE-24 –
''Front vertical operation'' does not operate.	1. Power Seat Switch (D) 2. Power Seat Switch (P) 3. Wire Harness 4. Slide Motor (D, P)	BE-23 BE-24 – BE-25
''Rear vertical operation'' does not operate.	1. Power Seat Switch (D) 2. Power Seat Switch (P) 3. Wire Harness 4. Front Vertical Motor (D, P)	BE-23 BE-24 – BE-25
''Reclining operation'' does not operate.	1. Power Seat Switch (D) 2. Power Seat Switch (P) 3. Wire Harness 4. Reclining Motor (D, P)	BE-23 BE-24 – BE-26
''Lumber support operation'' does not operate.	1. Lumber Support Switch (D) 2. Wire Harness 3. Lumber Support Motor (D)	BE-23 – BE-28

(D): Driver's Seat
(P): Passenger's Seat

POWER SEAT SWITCH

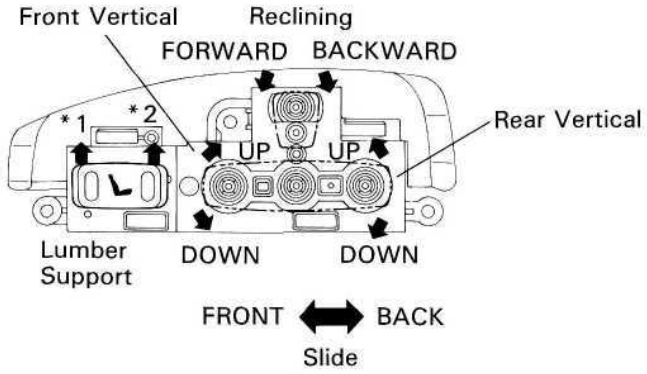
POWER SEAT SWITCH INSPECTION

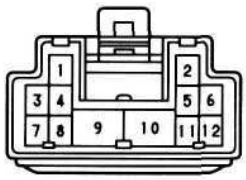
(DRIVER'S SIDE)

CONTINUITY

Inspect the switch continuity between terminals.

*1: FORWARD
*2: BACKWARD





N06201R eg-12-1

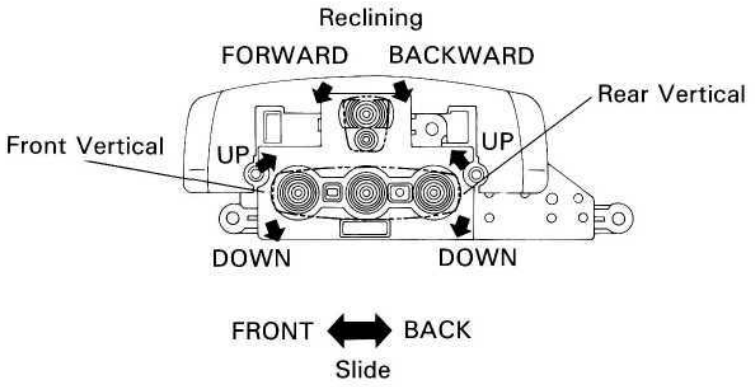
Switch position		1	2	3	4	5	6	7	8	9	10	11	12
Slide Switch	FORWARD					○			○	○	○		
	OFF					○			○	○			
	BACKWARD					○			○	○	○		
Front Vertical Switch	UP				○						○	○	○
	OFF				○							○	○
	DOWN				○						○	○	○
Rear Vertical Switch	UP		○				○	○			○		
	OFF		○				○	○					
	DOWN		○				○	○			○		
Reclining Switch	FORWARD				○			○		○	○		
	OFF				○			○		○			
	BACKWARD				○			○		○	○		
Lumber Support Switch	FORWARD	○		○						○	○		
	OFF	○		○						○			
	BACKWARD	○		○						○	○		

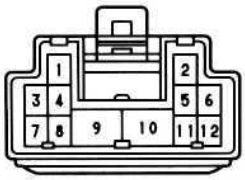
If continuity is not as specified, replace the switch.

(PASSENGER'S SIDE)

CONTINUITY

Inspect the switch continuity between terminals.

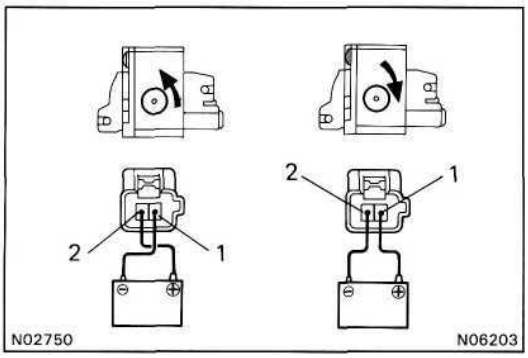




N06202R eg-12-1

Terminal / Switch position		2	4	5	6	7	8	9	10	11	12
Slide Switch	FORWARD			○			○	○	○		
	OFF			○			○	○			
	BACKWARD			○			○	○	○		
Front Vertical Switch	UP		○						○	○	○
	OFF		○							○	○
	DOWN		○						○	○	○
Rear Vertical Switch	UP	○			○	○			○		
	OFF	○			○	○					
	DOWN	○			○	○			○		
Reclining Switch	FORWARD		○			○		○	○		
	OFF		○			○		○			
	BACKWARD		○			○		○	○		

If continuity is not as specified, replace the switch.



POWER SEAT MOTOR

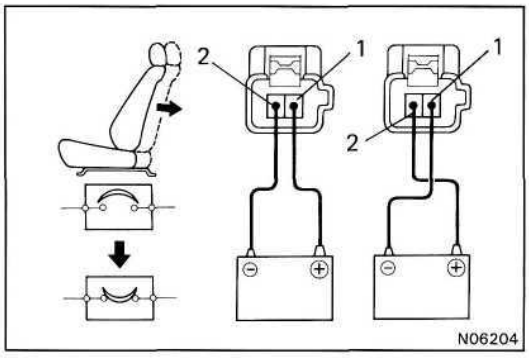
SLIDE MOTOR INSPECTION

MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (—) lead to terminal 2, check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

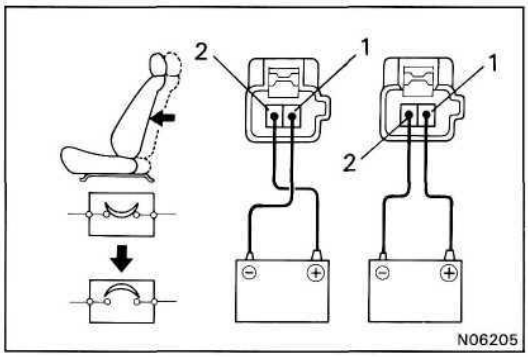
If operation is not as specified, replace the motor.



CIRCUIT BREAKER OPERATION

(a) Connect the positive (+) lead and the negative (—) lead from the battery to slide motor connector (illustrated terminals), and slide the seat to front end position.

(b) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 60 seconds.



(c) Reverse the polarity, check that the seat begins to move backwards within approximately 60 seconds.

If operation is not as specified, replace the motor.

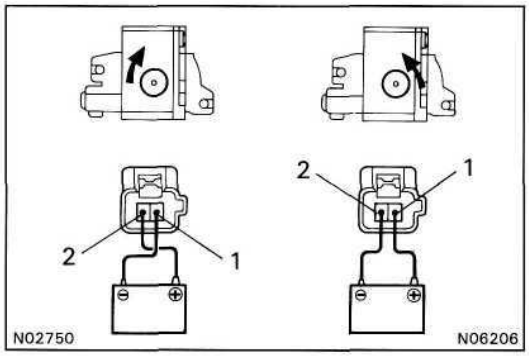
FRONT VERTICAL MOTOR INSPECTION

MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (—) lead to terminal 2, check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

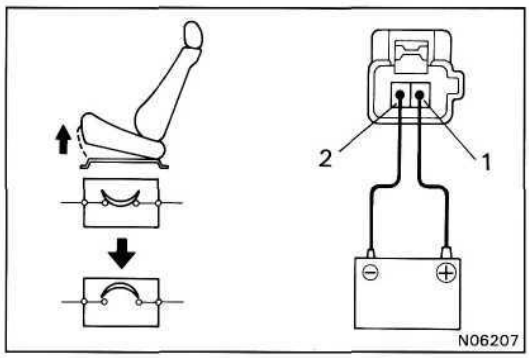
If operation is not as specified, replace the motor.

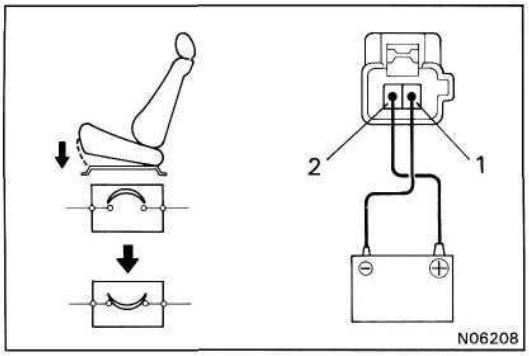


CIRCUIT BREAKER OPERATION

(a) Connect the positive (+) lead and the negative (—) lead from the battery to the front vertical motor connector (illustrated terminals), and move the front edge of seat cushion to the highest position.

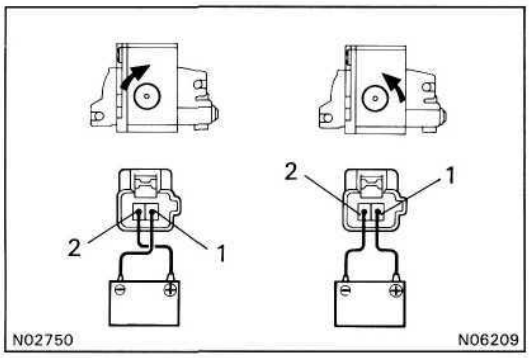
(b) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 60 seconds.





(c) Reverse the polarity, check that the seat cushion begins to descend within approximately 60 seconds.

If operation is not as specified, replace the motor.

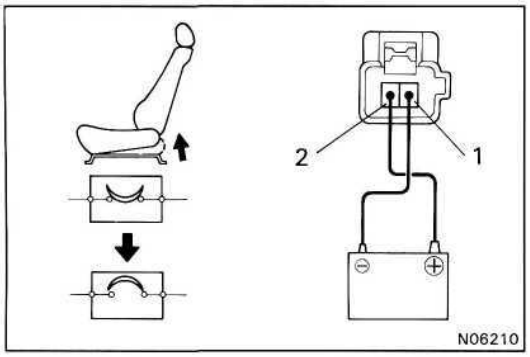


REAR VERTICAL MOTOR INSPECTION
MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (—) lead to terminal 1, check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

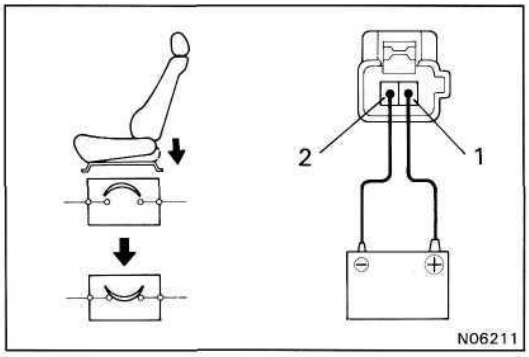
If operation is not as specified, replace the motor.



CIRCUIT BREAKER OPERATION

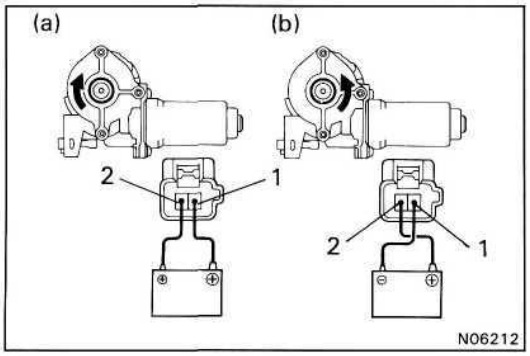
(a) Connect the positive (+) lead and the negative (—) lead from the battery to the rear vertical motor connector (illustrated terminals), and move the front edge of seat cushion to the highest position.

(b) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 60 seconds.



(c) Reverse the polarity, check that the seat cushion begins to descend within approximately 60 seconds.

If operation is not as specified, replace the motor.

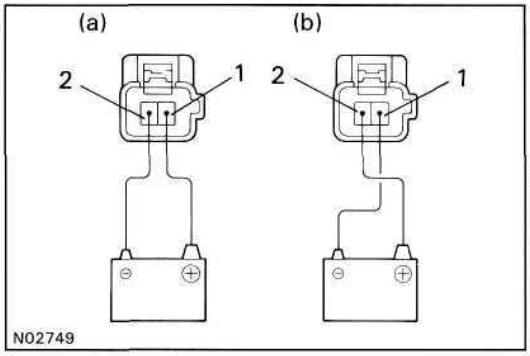


RECLINING MOTOR INSPECTION
MOTOR OPERATION DRIVER' S SEAT

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (—) lead to terminal 2, check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counterclockwise.

If operation is not as specified, replace the motor.

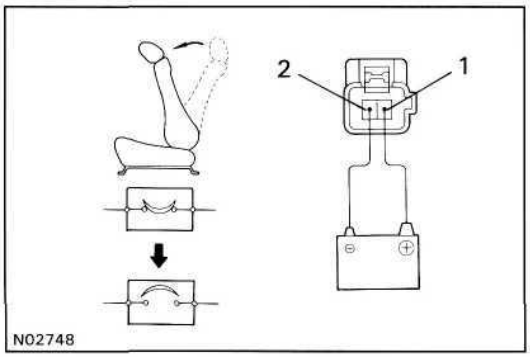


MOTOR OPERATION PASSENGER' S SEAT

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (—) lead to terminal 2, check that the motor turns counterclockwise.

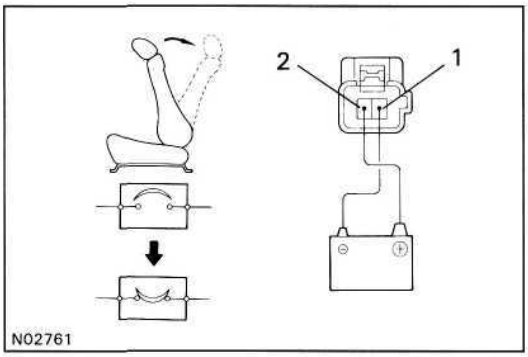
(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.



CIRCUIT BREAKER OPERATION DRIVER' S SEAT

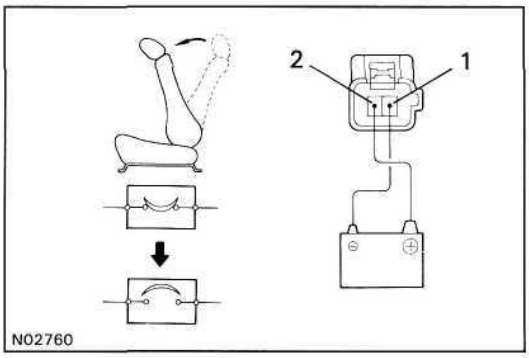
(a) Connect the positive (+) lead from terminal 1 and negative (—) lead to terminal 2.
Check that the seat back reclines to the most forward position.



(b) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 40 seconds.

(c) Reverse the polarity, check that the seat starts to fall backwards within approximately 60 seconds.

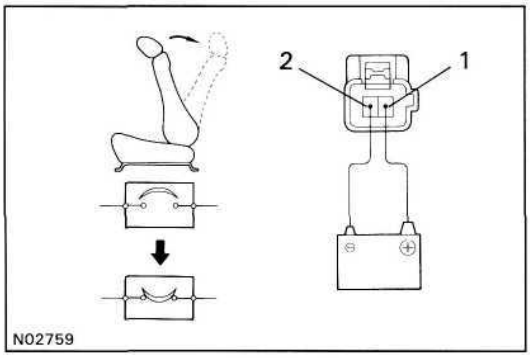
If operation is not as specified, replace the motor.



CIRCUIT BREAKER OPERATION PASSENGER'S SEAT

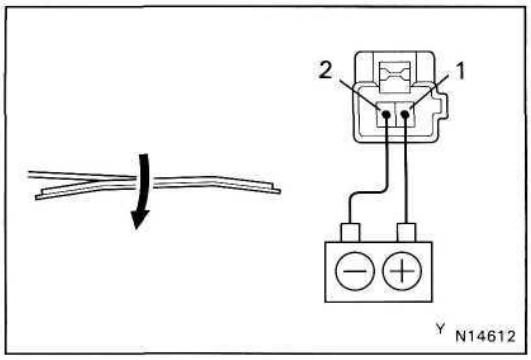
(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (—) lead to terminal 1 on the seat wire harness side connector, and recline the seat back to the most forward position.

(b) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 40 seconds.



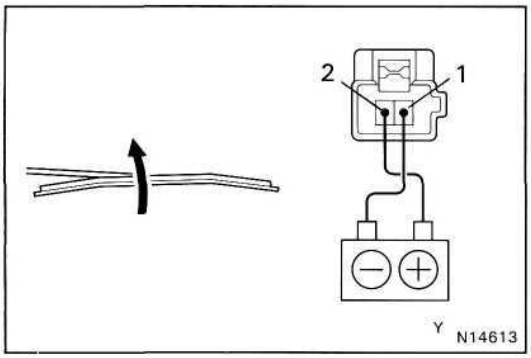
(c) Reverse the polarity, check that the seat back starts to fall backwards within approximately 60 seconds.

If operation is not as specified, replace the motor.



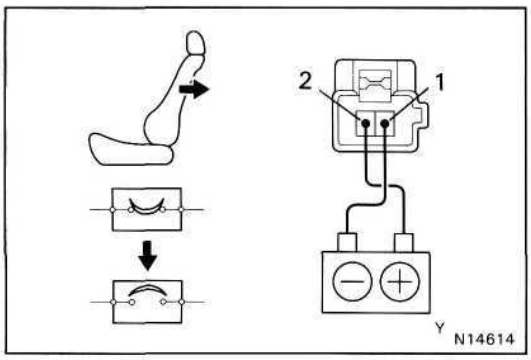
LUMBAR SUPPORT MOTOR INSPECTION
MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (—) lead to terminal 2, check that the lumbar support moves release side.



(b) Reverse the polarity, check that the lumbar support moves forward.

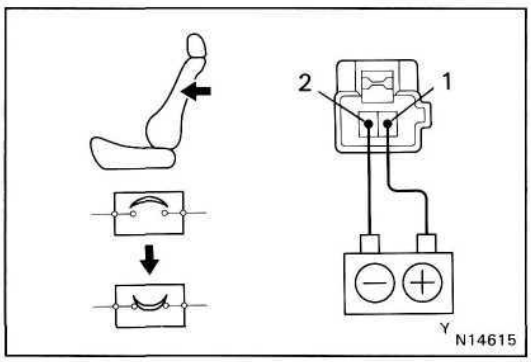
If operation is not as specified, replace the motor.



CIRCUIT BREAKER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (—) lead to terminal 1 on the lumbar support motor connector and move the lumbar support to front end position.

(b) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 60 seconds.

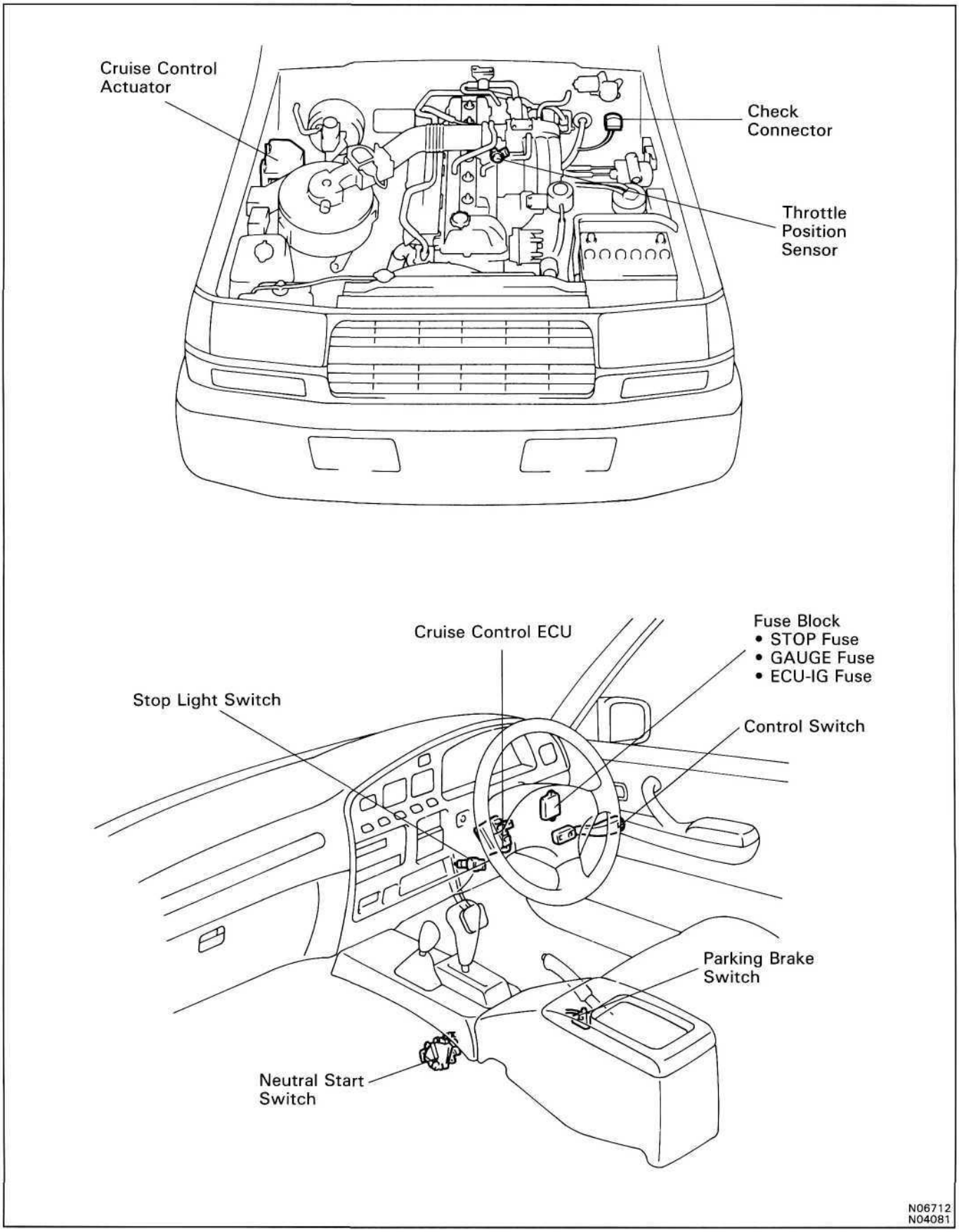


(c) Reverse the polarity, check that the lumbar support begins to move release side within approximately 60 seconds.

If operation is not as specified, replace the motor.

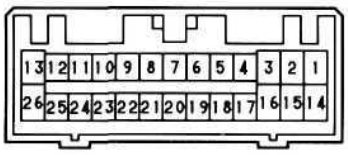
CRUISE CONTROL SYSTEM

PARTS LOCATION



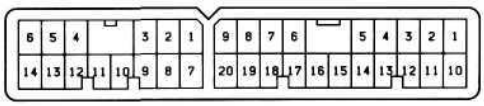
CONNECTOR DIAGRAMS

Cruise Control ECU

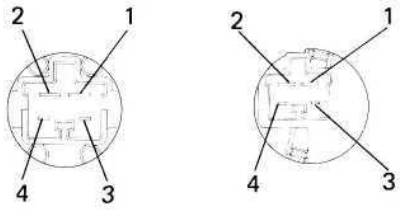


Control Switch (in Combination Switch)

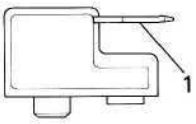
Connector "A" Connector "B"



Stop Light Switch



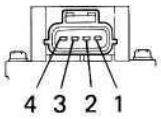
Parking Brake Switch



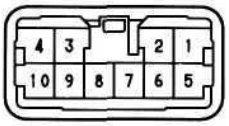
Speed Sensor

Actuator

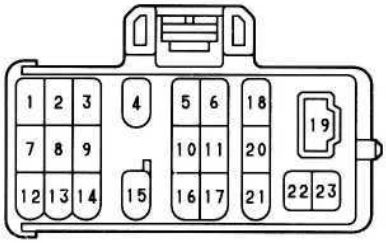
Throttle Position Sensor
(1FZ-FE)



Ignition Switch

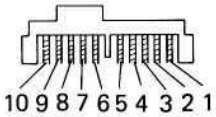


Check Connector
(TDCL)

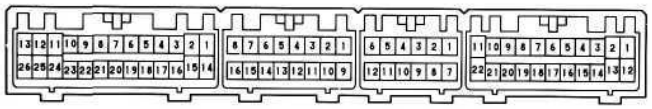


Combination Meter
(Cruise Control Indicator)
(Brake Warning)

Connector "A"



EFI ECU



SYSTEM DESCRIPTION

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

Basic Operation

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

1. MAIN SWITCH OPERATION

When the main switch is pushed ON, current flows from terminal 4 of the CC ECU → terminal B-1 5 of the control switch → terminal B-20 of the switch → ground.

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

2. CONTROL SWITCH OPERATION

The control switch controls the SET, COAST, RESUME, ACCEL and CANCEL functions. When the control switch is turned to each position, current flows from terminals 18 of the CC ECU → terminals B-5 of the control switch → terminal B-20 of the switch → ground.

In the way, the CC ECU detects each position the control switch is turned to, and starts operation.
HINT: The SET function is detected by the CC ECU when the control switch released from SET/COAST.

3. SPEED CONTROL OPERATION

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

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

When the actual vehicle speed drops below the set speed, the CC ECU sends a signal (voltage) from terminal 12 → terminal 6 of actuator → (motor) → terminal 7 of actuator → terminal 11 of CC ECU. This causes the motor to rotate the actuator arm in the throttle opening direction, increasing the vehicle speed. Then, when the arm reaches the prescribed angle, the CC ECU detects this at terminal 25 and stops the signal from 1 2.

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

4. MANUAL CANCEL OPERATION

The CC system has the following methods of cancellation:

- **Speed Control Switch (CANCEL)**
  When the control switch is turned to CANCEL position.
- **Parking Brake Switch**
  When the parking brake lever is pulled, the parking brake switch is turned ON and sends a cancellation signal (ground voltage) to terminal 3 of the CC ECU.
- **Neutral Start Switch (A/T)**
  When the shift lever is set to "N" or "P" range, the neutral start switch is turned ON and sends a cancellation signal (ground voltage) to terminal 2 of the CC ECU.
- **Stop Light Switch**
  When the brake pedal is depressed, SW B of the stop light switch is turned OFF, the magnetic clutch (in actuator) is released, and SW A of the stop light switch is turned ON and sends a cancellation signal (battery voltage) to terminal 16 of the CC ECU.

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

DIAGNOSIS SYSTEM

Output of Diagnostic Code

READ DIAGNOSTIC CODE

(Type A)

(a) Turn the ignition switch on.

(b) Turn the control switch to SET or RESUME position and keep it there.

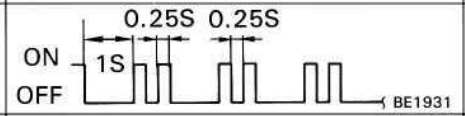
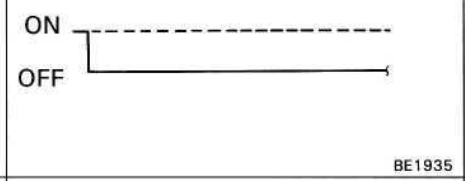
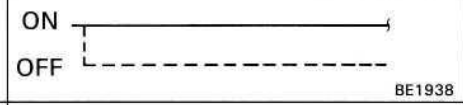
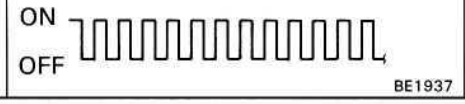
(c) After pushing the main switch ON, keep the SET or RESUME switch ON for 3 seconds.

(d) Check that the "CRUISE" indicator light lights up in the combination meter.

(e) Turn the SET/COAST switch off.

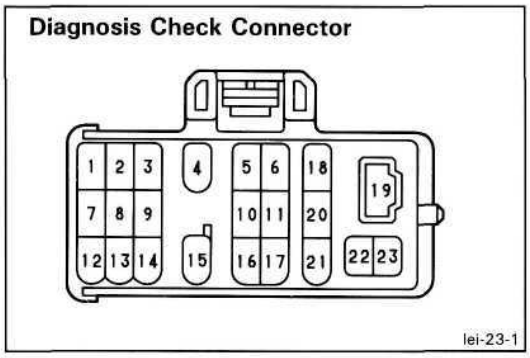
(f) Meet the conditions listed in the table below.

(g) Read the diagnosis code on the cruise control indicator light.

No.	Conditions	Indication code	Diagnosis
1	Turn the control switch to SET/COAST position.		SET/COAST circuit is normal.
2	Turn the control switch to RES/ACC position.		RES/ACC circuit is normal.
3	Each cancel switch is turned ON. • Control switch (to CANCEL) • Stop light switch • Parking brake switch • Neutral start switch (to N or P range)		Each cancel switch is normal.
4	Drive at approx. 40 km/h (25 mph) or below.		Speed sensor circuit is normal.
	Drive at approx. 40 km/h (25 mph) or over.		Speed sensor circuit is normal.

HINT:

- Indication codes appear in order from No. 1.
- If there is no indication code, perform troubleshooting and inspection. (See page BE-34)
- Indication is stopped when the MAIN switch is repushed.



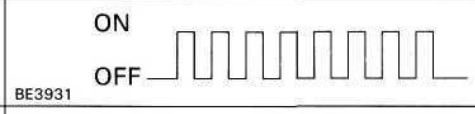
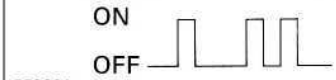
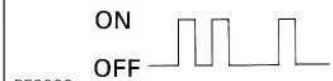
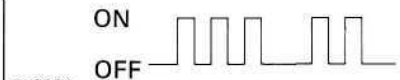
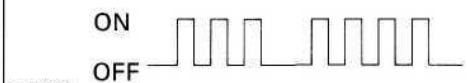
(Type B)

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

(b) While stopped, connect terminals E_1 (3) and Tc (11) of the check connector.

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

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

Code No.	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
–		Normal
11		• Duty ratio of 100 % output to motor acceleration side. • Overcurrent in motor circuit.
12		• Overcurrent in magnet clutch circuit. • Open in magnet clutch circuit.
13		• Open in actuator motor circuit. • Position sensor detects abnormal voltage. • Position sensor signal value does not change when the motor operates.
21		• Vehicle speed signal not sent for 140 msec. or longer
*23		• Actual vehicle speed has dropped by 16 km/h (10 mph) or more below the set speed.
32		• Short in control switch circuit.
34		• Voltage abnormality in control switch.

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

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

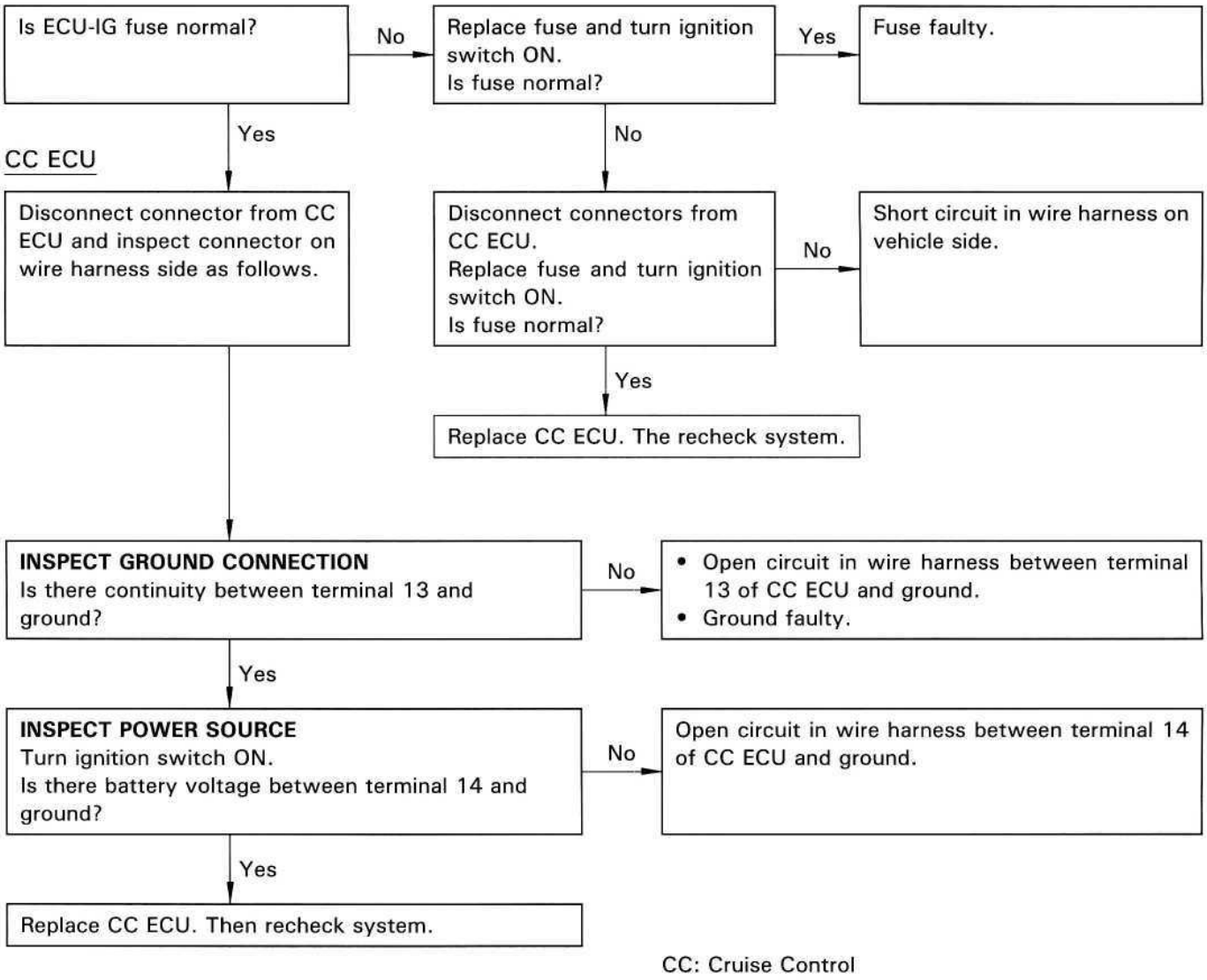
TROUBLESHOOTING

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

Chart No.					D	C	C	F	H	G	E	I		
Inspection Item / Diagnosis Code / Problem	Type B	Type A		CC ECU	Actuator	Main Switch (in Control Switch)	Control Switch	Stop Light Switch	Neutral Start Switch	Parking Brake Switch	Speed Sensor	Throttle Position Sensor	Speed Control Cable and Control Link	Wire Harness
• "CRUISE" indicator light blinks 5 times. • Cruise control system does not set. • Cruise control system does not operate.	11			2	1									3
	12			3	1			2						4
	13			2	1									3
	21			2							1			3
	23			4	3						2		1	
	32			2			1							3
	34			2			1							
	41			1										
	Normal	4	OK	8	7	1	2	3	4	5			6	9
			NG	2							1			
Set speed deviates on high or low side.				4	3						1		2	
Large speed increase or speed drop when the speed control switch turned to SET.				4	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		1										
		NG		2				1						
Set Speed does not cancel when parking brake lever pulled.	3	OK		1										
		NG		2						1				
Set speed does not cancel when shifted to "N" range.	3	OK		1										
		NG		2					1					
Vehicle speed does not decrease when speed control switch turned to COAST.	1	OK		4	1						3		2	
		NG		2			1							
Vehicle speed does not accelerate when speed control switch turned to ACCEL.	2	OK		4	1						3		2	
		NG		2			1							
Vehicle speed does not return to memorized speed when control switch turned on RESUME.	2	OK		4	1						3		2	
		NG		2			1							
Set speed does not cancel when speed control switch turned to CANCEL.	3	OK		1										
		NG		2			1							
Speed can be set below about 40 km/h (25 mph).	4	OK		1										
		NG		2							1			
Cruise control will not disengage even at about 40 km/h (25 mph).	4	OK		1										
		NG		3							1		2	
Acceleration response is sluggish when speed control switch turned to "ACCEL" or "RESUME".				4	3		1				2		1	

A POWER SOURCE CIRCUIT

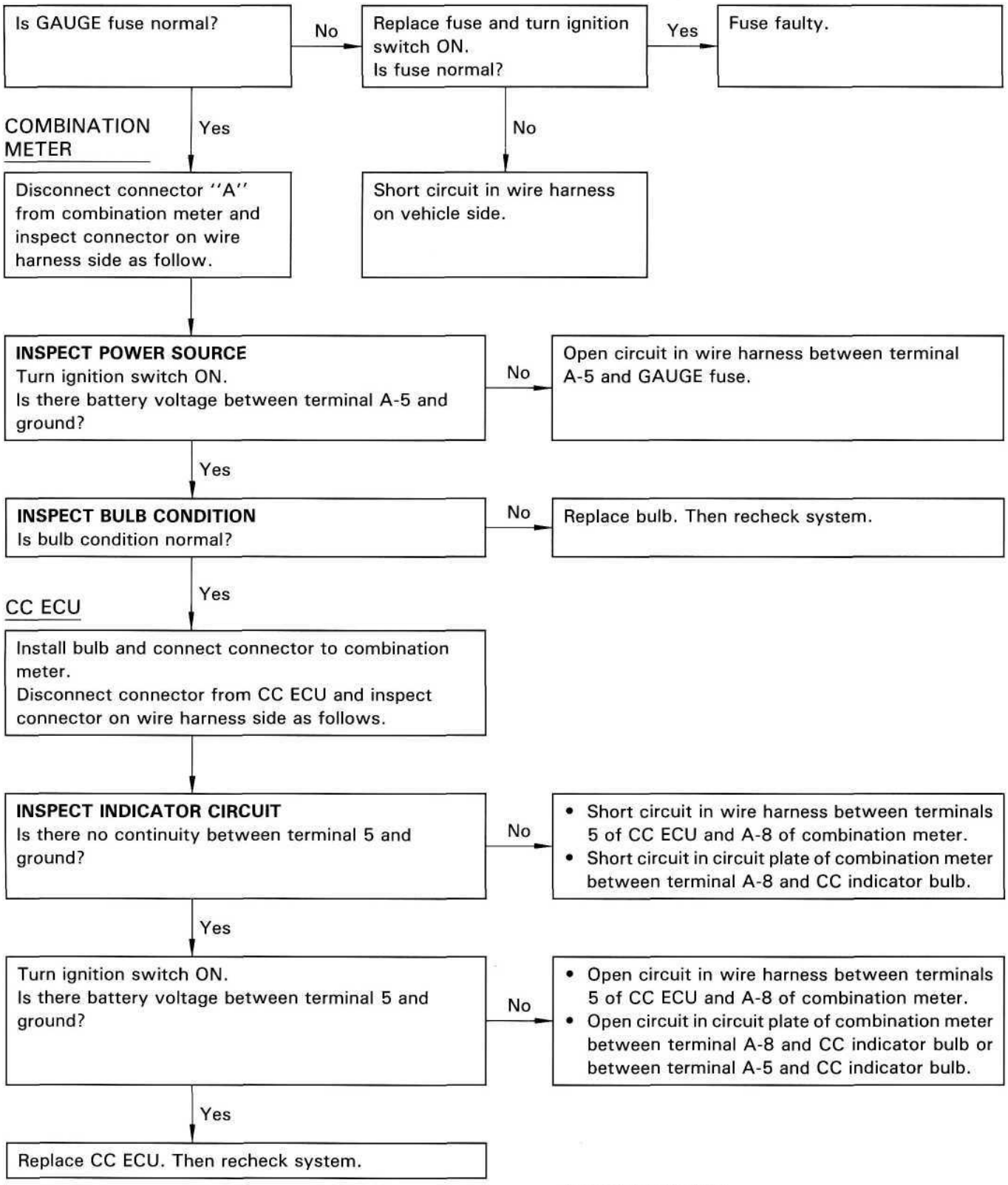
HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



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 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 B-20 and ground?

No → • Open circuit in wire harness between terminal B-20 of control switch and ground.
• Ground faulty.

Yes

INSPECT CONTROL SWITCH (See page BE-47)
Is control switch operation normal?

No → Replace control switch. Then recheck system.

Yes

CC ECU

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

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

Yes → Short circuit in wire harness between terminals 4 of CC ECU and B-15 of control switch.

No

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 B-15 of control switch.

Yes

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

Yes → Short circuit in wire harness between terminals 18 of CC ECU and B-5 of control switch.

No

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

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

No → Open circuit in wire harness between terminals 18 of CC ECU and B-5 of control switch.

Yes

Replace CC ECU. Then recheck system.

CC: Cruise Control

D ACTUATOR CIRCUIT

HINT: While carrying out the following inspection, make certain that 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-48)
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 SAFETY MAGNETIC CLUTCH CIRCUIT
Is there approx. 38.5 Ω 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-47)
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 MAGNETIC CLUTCH CIRCUIT
Is there approx. 38.5 Ω 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 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 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

E SPEED SENSOR CIRCUIT

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

SPEED SENSOR

Disconnect connector from speed sensor 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 speed sensor and ground.
• Ground faulty.

Yes ↓

INSPECT SPEED SENSOR (See page BE-47)
Is speed sensor operation normal?

No → Replace speed sensor. Then recheck system.

Yes ↓

CC ECU

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

↓

INSPECT 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 speed sensor.

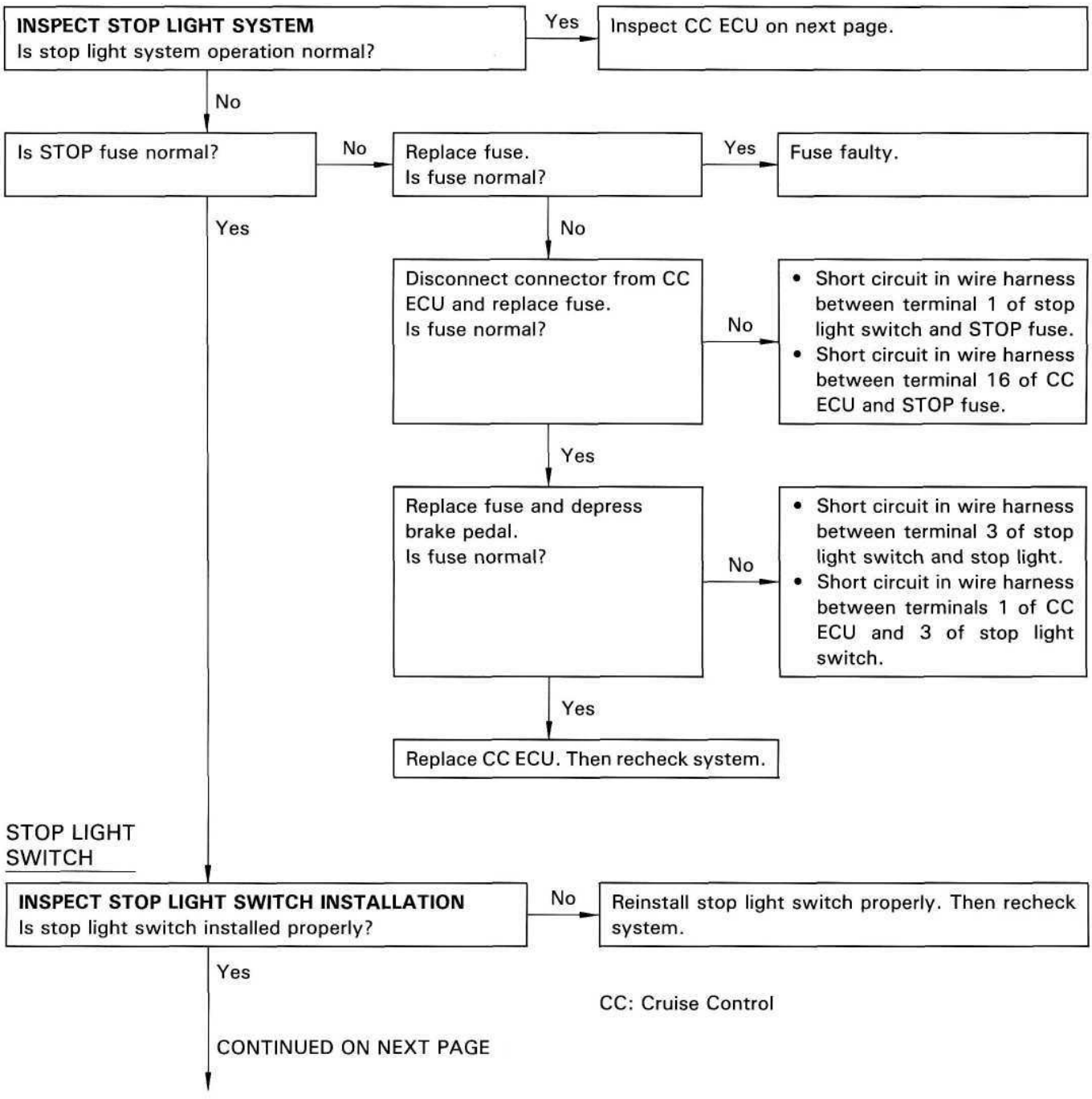
Yes ↓

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.



CONTINUED FROM PREVIOUS PAGE

STOP LIGHT SWITCH

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

INSPECT POWER SOURCE
Is there battery voltage between terminal 1 and ground?

No → Open circuit in wire harness between terminal 1 of stop light switch and STOP fuse.

Yes

INSPECT STOP LIGHT CIRCUIT
Connect terminals 1 and 3.
Do stop lights light up?

No →
- Open circuit in wire harness between terminal 3 of stop light switch and ground.
- Ground faulty.

Yes

INSPECT STOP LIGHT SWITCH (See page BE-47)
Is stop light switch operation normal?

No → Replace stop light switch. Then recheck system.

Yes

CC ECU

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

→ If stop light system operation is normal, start inspection from this step.

INSPECT STOP LIGHT SWITCH CIRCUIT
Is there battery voltage between terminal 1 and ground?

No → Open circuit in wire harness between terminal 1 of CC ECU and STOP fuse.

Yes

Is there battery voltage between terminal 16 and ground when brake pedal depressed?

No → Open circuit in wire harness between terminals 16 of CC ECU and 3 of stop light switch.

Yes

Replace CC ECU. Then recheck system.

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.

INSPECT PARKING BRAKE SWITCH
(See page BE-47)
Is parking brake switch operation normal?

No → Replace parking brake switch. Then recheck system.

Yes ↓

CC ECU

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

INSPECT PARKING BRAKE SWITCH CIRCUIT
Is there continuity between terminal 3 and ground when parking brake lever is pulled?

No → Short circuit in wire harness between terminal 3 of CC ECU and parking brake switch.

Yes ↓

Is there no continuity between terminal 3 and ground when parking brake lever is released?

No → Open circuit in wire harness between terminal 3 of CC ECU and parking brake switch.

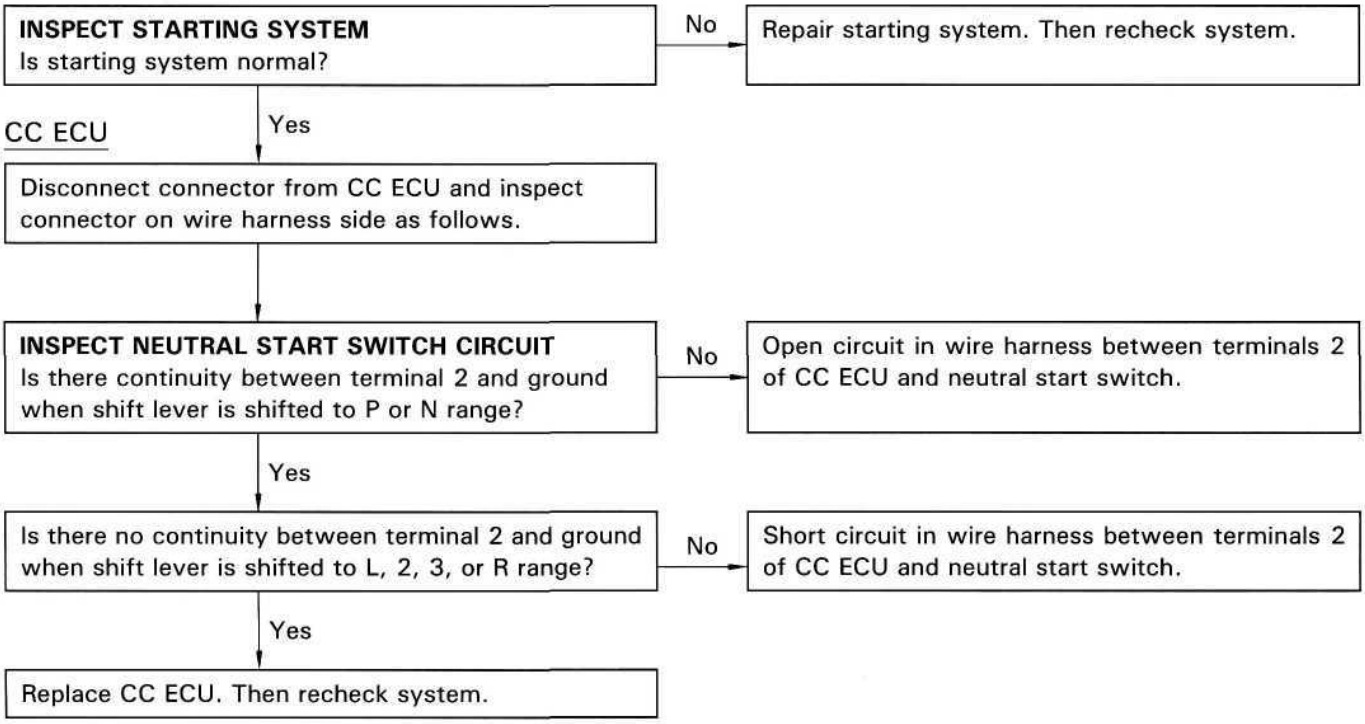
Yes ↓

Replace CC ECU. Then recheck system.

CC: Cruise Control

H NEUTRAL START SWITCH CIRCUIT

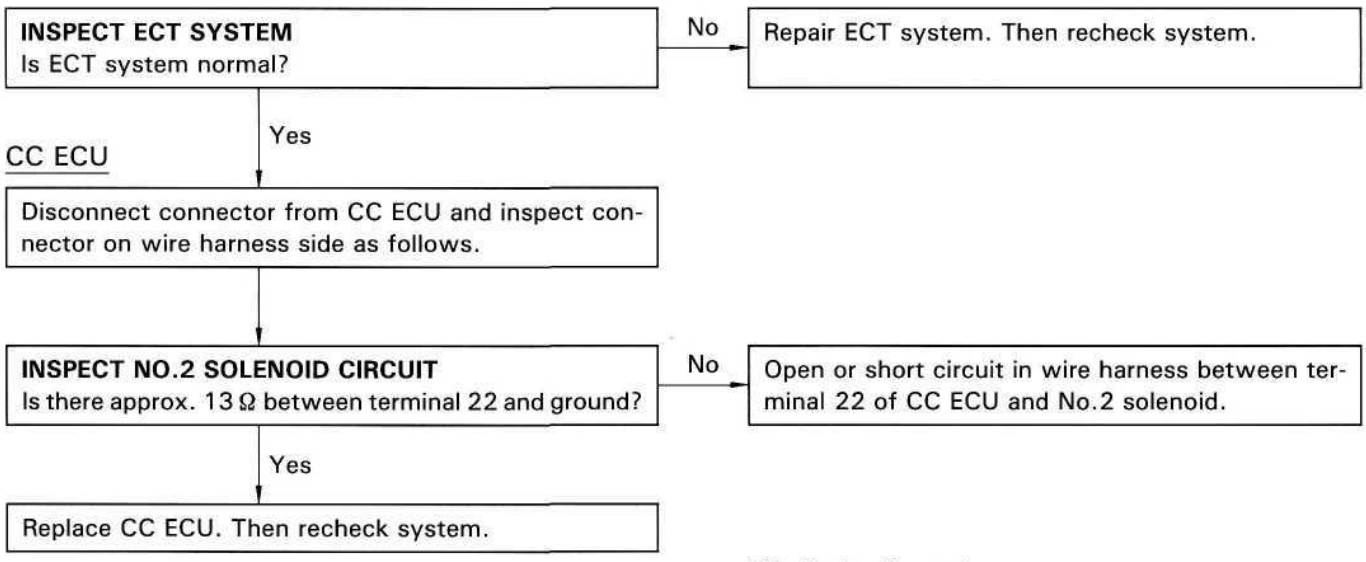
HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



CC: Cruise Control

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

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



CC: Cruise Control

J IDL SIGNAL CIRCUIT (w/ 1FZ-FE Engine)

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 (Refer to FI Section of ENGINE Repair Manual.) Is throttle position sensor adjustment normal?

No → Adjust position sensor position. Then recheck system.

Yes

INSPECT THROTTLE POSITION SENSOR (Refer to FI Section of ENGINE Repair Manual.) 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

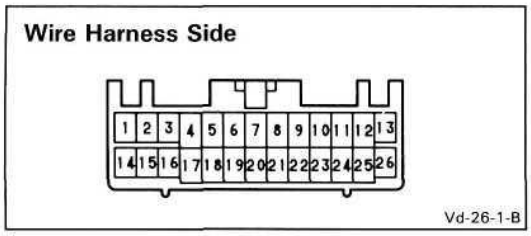
Is there no continuity between terminal 23 and ground when acceleration pedal is depressed?

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 Circuit

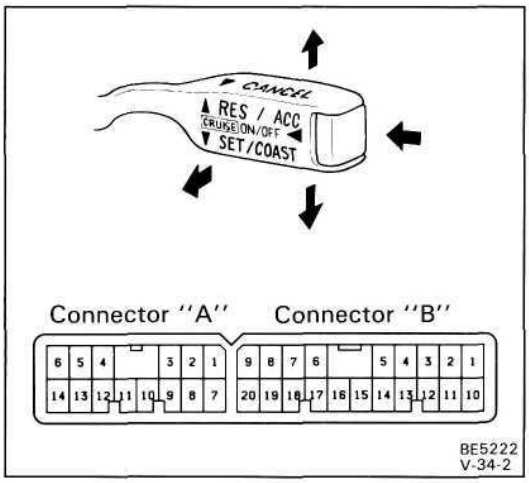
INSPECT ECU CIRCUIT

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

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

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

If circuit is as specified, try another ECU.



CONTROL SWITCH INSPECTION

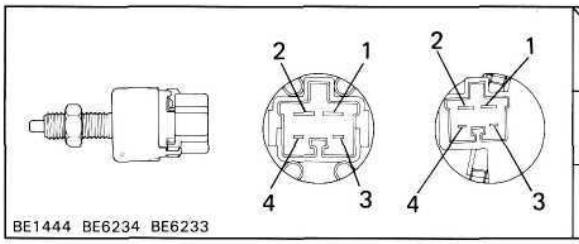
INSPECT SWITCH

Switch position		Terminal B20	B11	B5	B17	B15
Main	ON	○				○
	OFF					
Control	RES/ACC	○		○		
	SET/COAST	○		○		
	CANCEL	○		○		

If the continuity is not as specified, replace the control switch.

STOP LIGHT SWITCH INSPECTION

INSPECT SWITCH



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

If continuity is not as specified, replace the stop light switch.

NEUTRAL START SWITCH INSPECTION

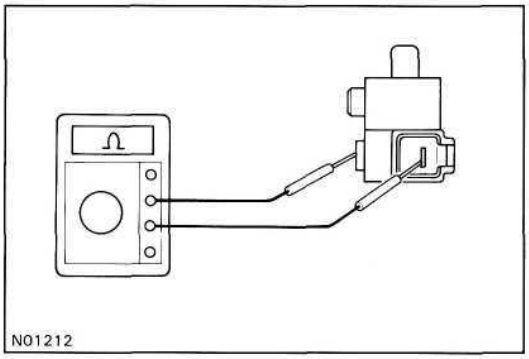
See page AT section

THROTTLE POSITION SWITCH INSPECTION

(Refer to FI section of Engine Repair Manual)

PARKING BRAKE SWITCH INSPECTION

INSPECT SWITCH



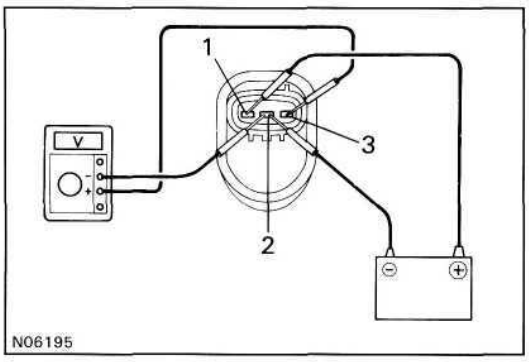
(a) Check that there is continuity between terminal and the switch set nut with switch pin released, (parking brake lever pulled up)

(b) Check that there is no continuity between terminal and the switch set nut with switch pin pushed in. (parking brake lever released)

If operation is not as specified, replace the switch.

SPEED SENSOR INSPECTION

INSPECT SENSOR



(a) Connect the positive (+) lead from battery to terminal 1 and negative (—) lead to terminal 2.

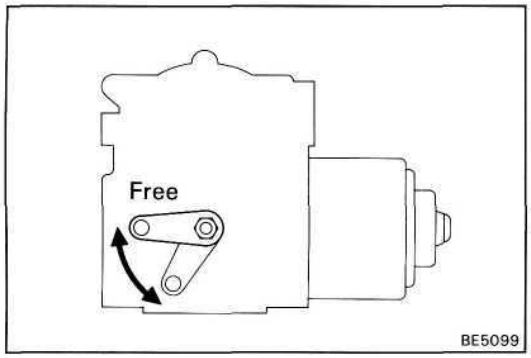
(b) Connect the positive (+) lead from tester to terminal 3 and negative (—) lead to terminal 2.

(c) Revolve shaft.

(d) Check that there is voltage changer from approx. 0 V to 11 V or more between terminal 3 and 2.

HINT: The voltage change should be 20 times per each revolution of the speed sensor shaft.

If operation is not as specified, replace the sensor.

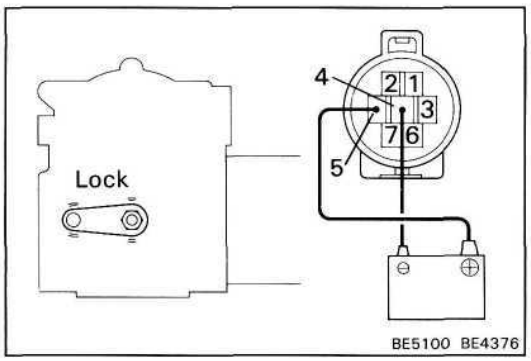


CRUISE CONTROL ACTUATOR INSPECTION

INSPECT ACTUATOR

(Magnet Clutch)

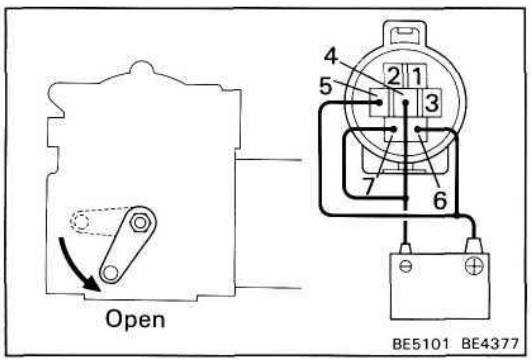
(a) Check that the arm moves smoothly by hand.



(b) Connect the positive (+) lead from the battery to terminal 5 and the negative (—) lead to terminal 4. (magnet clutch turned ON)

(c) Check that the arm does not move by hand.

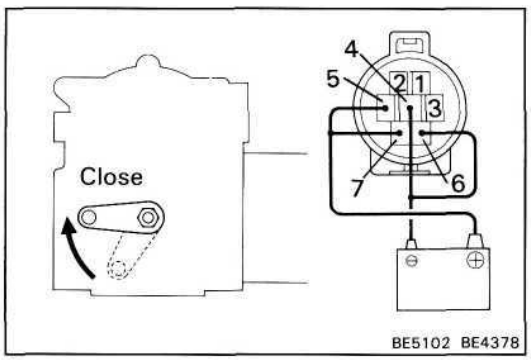
If operation is not as specified, replace the motor.



(Motor)

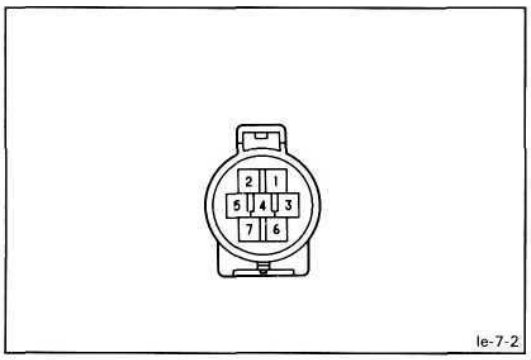
(a) With the magnetic clutch ON, connect the positive (+) lead from the battery to terminal 6 and the negative (—) lead to terminal 7, check that the arm moves to the open side.

(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 close side.

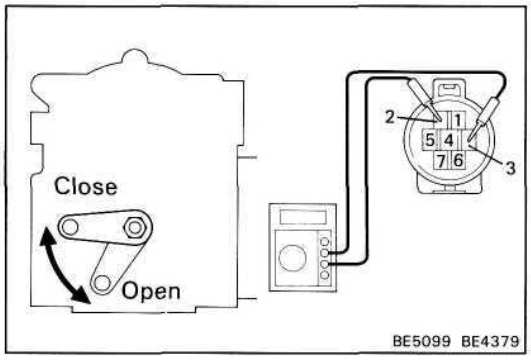
(d) When the arm reaches to the closed position, check that the motor operation stops.



(Position Sensor)

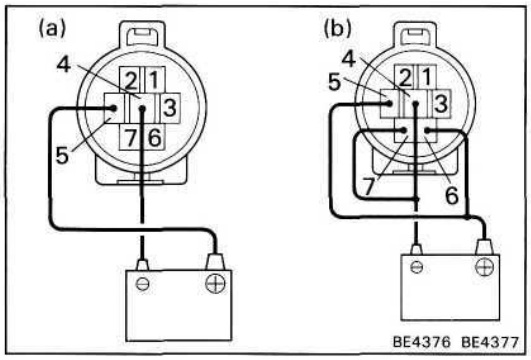
(a) Measure the resistance between terminals 1 and 3.

Resistance: Approx. 2 kfl



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

If operation is not as specified, replace the motor.



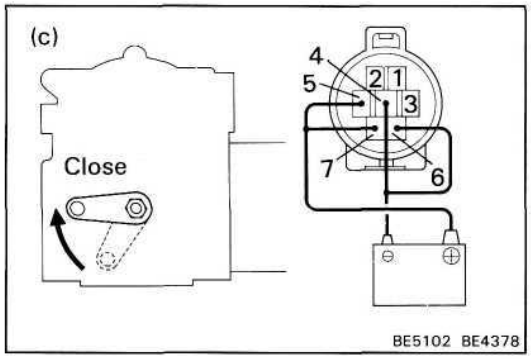
CONTROL LINK ASSEMBLY ADJUSTMENT

ADJUST CONTROL LINK ASSEMBLY

(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)

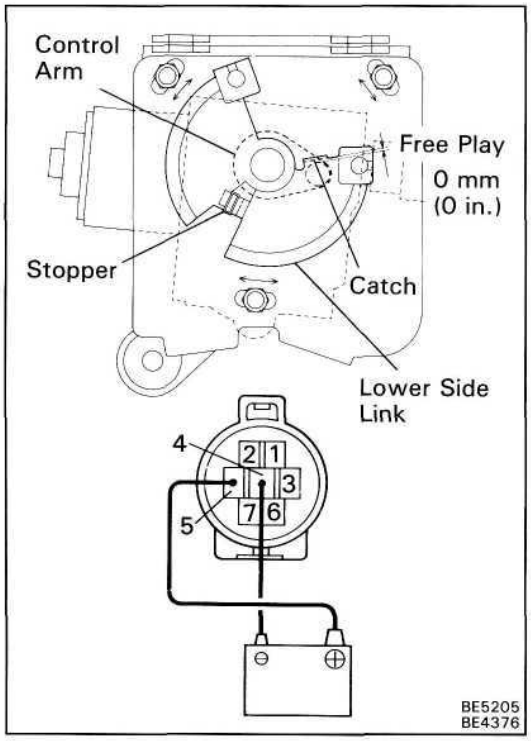
NOTICE: Keep the magnet clutch ON until adjustment of control link assembly is completed.

(b) With the magnetic 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 magnetic 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 link 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.

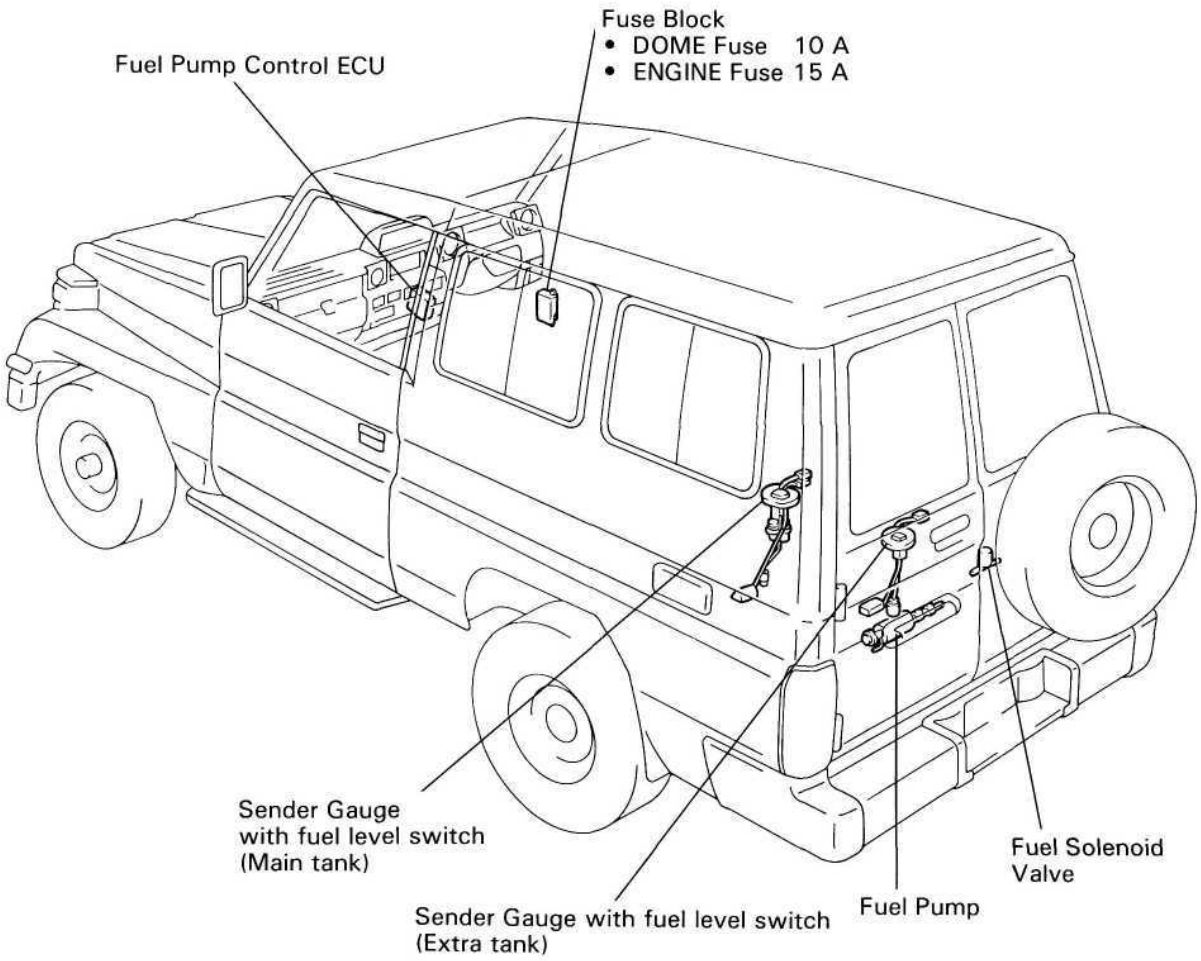
(f) In condition (d), install and torque the three nuts.

(g) Disconnect lead wire from the actuator.

EXTRA (SUB) TANK SYSTEM

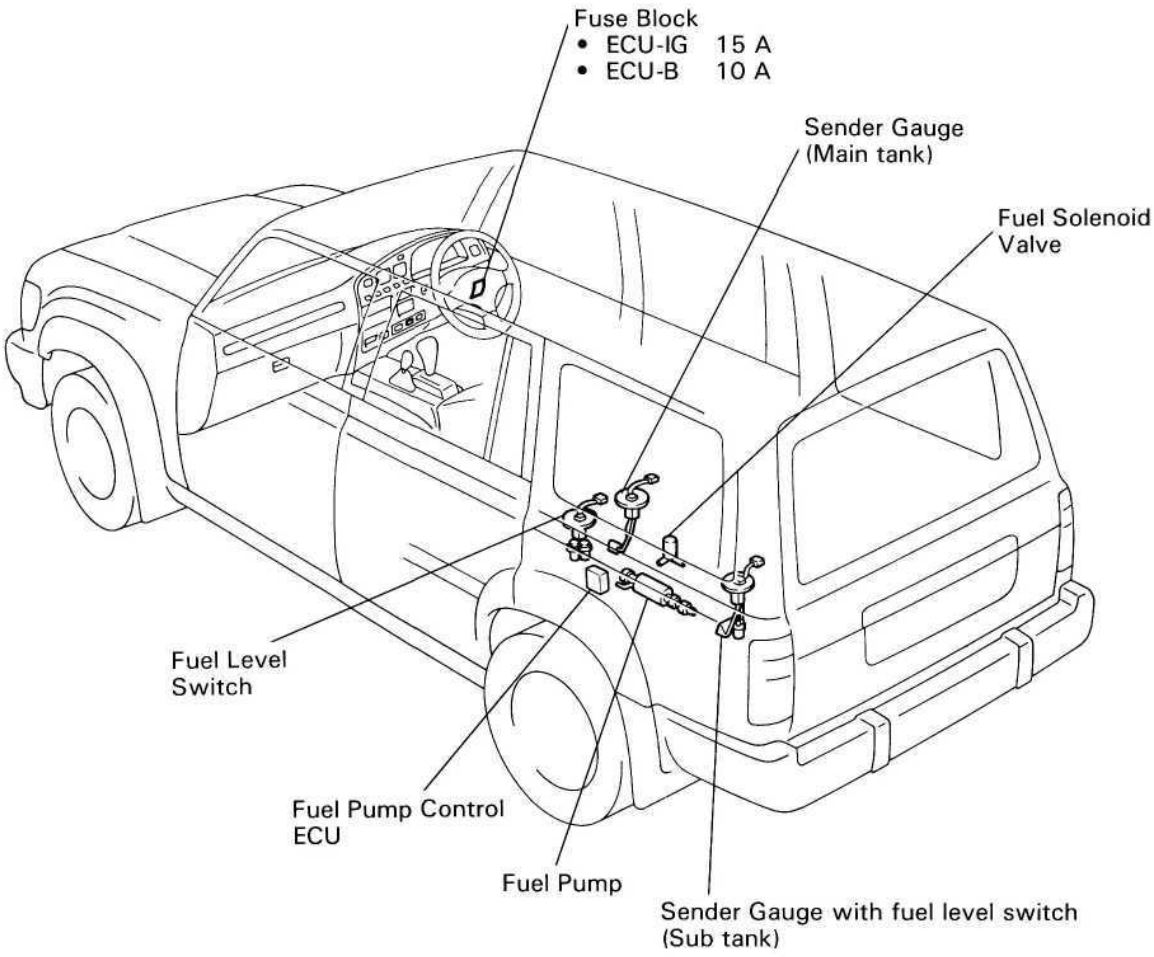
PARTS LOCATION

FZJ70 type



N06931

FZJ80 type

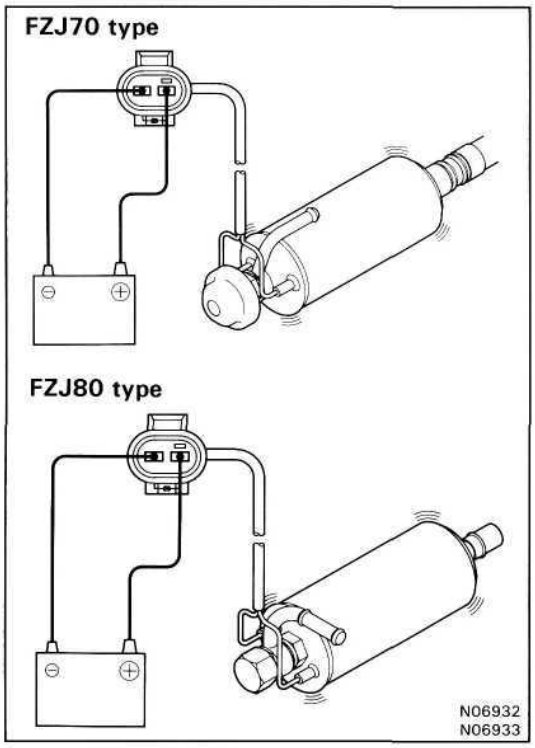


N06716

TROUBLESHOOTING

First use the diagnosis system to check for malfunctions. Repair any malfunctions found. Then check for malfunction in the parts shown in the table below.
The most likely causes of malfunction are shown in the order of their probability.
Inspect each part in the order shown, and replace the part when it is found to be faulty.

Trouble	Part name	See page
EXTRA (SUB) TANK system does not operate	1. Fuse FZJ70 type • DOME FUSE • ENGINE Fuse FZJ80 type • ECU-IG Fuse • ECU-B Fuse	—
	2. Fuel Pump	BE-53
	3. Sub Fuel Switch	BE-53
	4. Fuel Solenoid Valve	BE-55
	5. Fuel Level Switch (Main tank or Extra (sub) tank)	BE-54
	6. Sender Gauge	BE-54
	7. Fuel Pump Control ECU	BE-56
	8. Wire Harness	—



FUEL PUMP

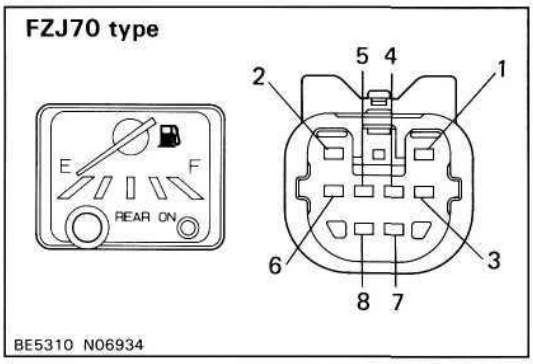
INSPECT FUEL PUMP OPERATION

Connect the positive (+) lead from the battery to terminal 1 of the connector, and the negative (—) lead to terminal 2. Check that the fuel pump operates.

NOTICE:

- **These tests must be performed quickly (within 10 seconds) to prevent the coil from burning out.**
- **Keep the fuel pump as far away from the battery as possible.**
- **Always perform switching at the battery side.**

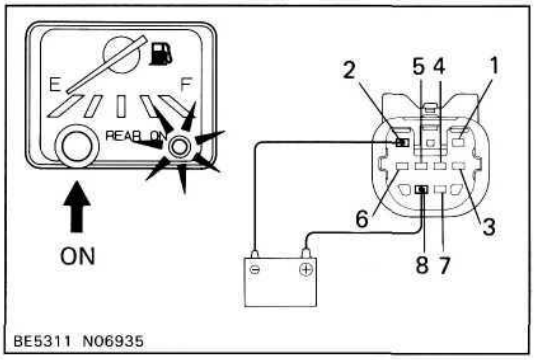
If operation is not as specified, replace the fuel pump.



SUB FUEL SWITCH

INSPECT SUB FUEL SWITCH

Terminal / SW Position	4	7	Illumination 1	Illumination 3
OFF				
ON	○——	——○	○	○

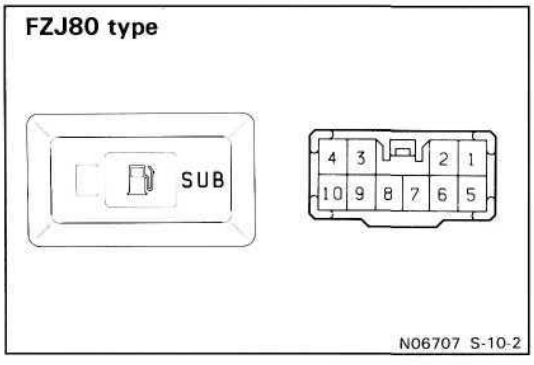


INSPECT INDICATOR LIGHT

(a) Connect the positive (+) lead from the battery to terminal 8 and the negative (—) lead to terminal 2.

(b) Set the switch ON, check that the indicator light lights up.

If the indicator light does not light up, replace the accessory meter.

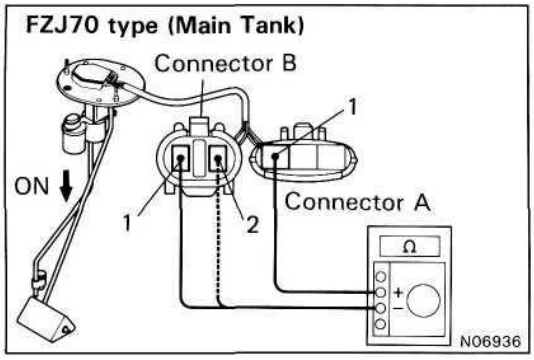


INSPECT SUB FUEL SWITCH

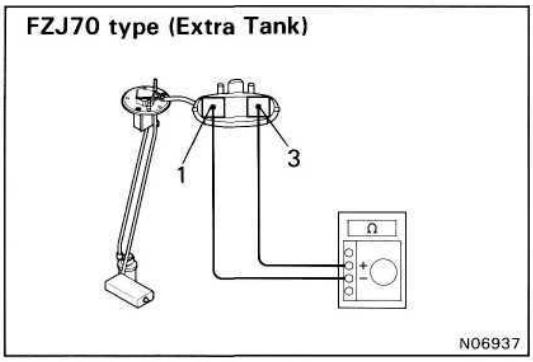
Terminal / SW Position	6	9	Illumination 1	Illumination 2	Illumination 3	Illumination 4
OFF						
ON	○——	——○	○	○	○	○

If continuity is not as specified, check the bulb or replace the switch.

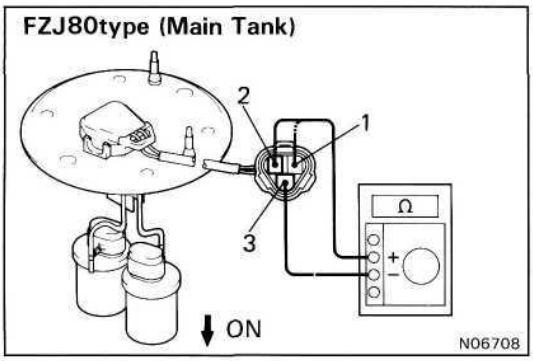
FZJ70 type (Main Tank)



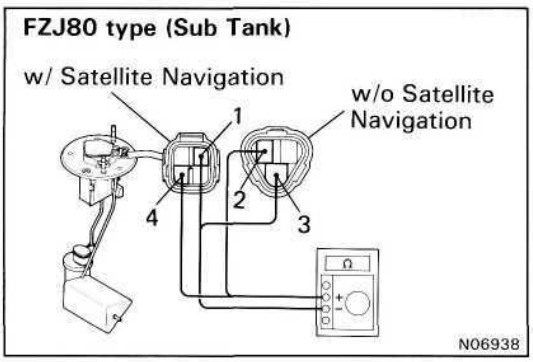
FZJ70 type (Extra Tank)



FZJ80type (Main Tank)



FZJ80 type (Sub Tank)



FUEL LEVEL SWITCH

INSPECT FUEL LEVEL SWITCH

(Continuity)

FZJ7O type (Main Tank)

Terminal / Switch Position	Connector A	Connector B	
	1	1	2
ON (Float down)	○	○	○
OFF (Float up)			

FZJ7O type (Extra Tank)

Terminal / Switch position	1	3
ON (Float down)	○	○
OFF (Float up)		

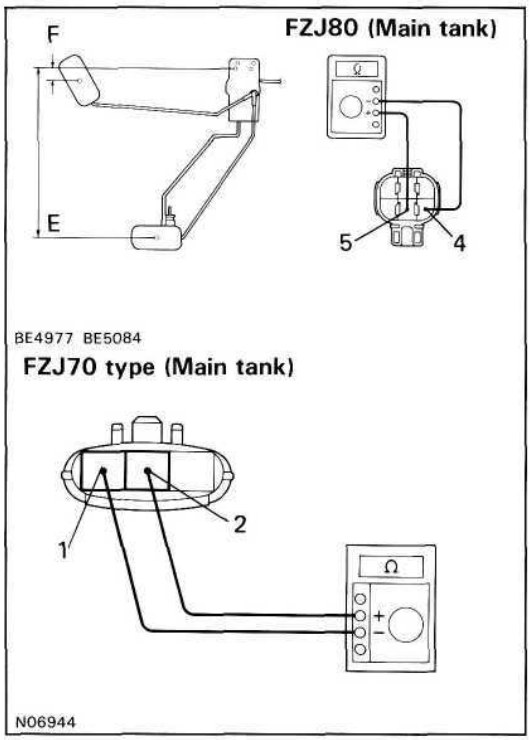
FZJ80 type (Main Tank)

Terminal / Switch position	1	2	3
ON (Float down)	○	○	○
		○	○
OFF (Float up)			

FZJ80 type (Sub Tank)

Terminal / Switch position	w/ Satellite Navigation		w/o Satellite Navigation	
	1	4	2	3
ON (Float down)	○	○	○	○
OFF (Float up)				

If continuity is not as specified, replace the switch.



FUEL SENDER GAUGE

INSPECT FUEL SENDER GAUGE

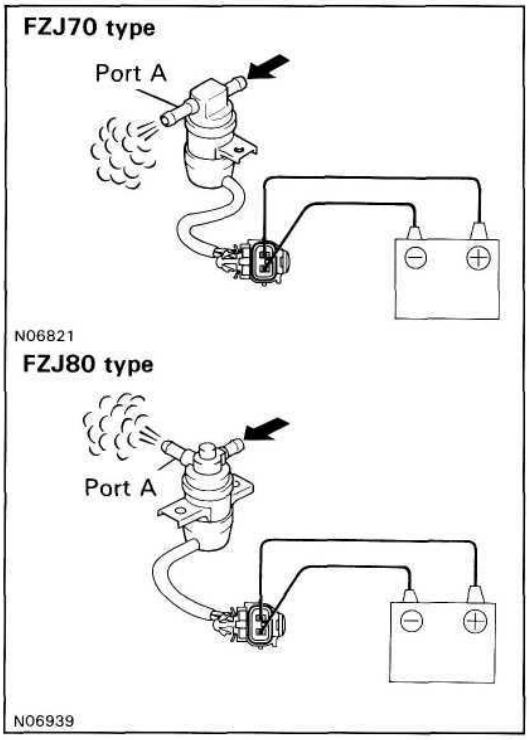
Measure the resistance.

FZJ8O type (Main tank)

Float position mm (in.)	Resistance (Ω)
F approx. 15 (0.59)	approx. 3
E approx. 200 (7.87)	approx. 110

FZJ7O type (Main tank)

Float position mm (in.)	Resistance (Ω)
F approx. 39 (1.54)	approx. 3
E approx. 303 (11.93)	approx. 110

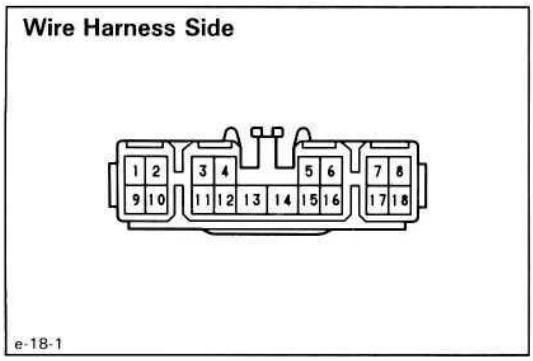


FUEL SOLENOID VALVE

INSPECT FUEL SOLENOID VALVE

1. Check that air flows out port A when battery voltage is applied across the terminals.
2. Check that air does not flow out port A when battery voltage is not applied across the terminal.

   Replace the valve if either test is not successful.



FUEL PUMP CONTROL ECU

FUEL PUMP CONTROL ECU INSPECTION

ECU CIRCUIT

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

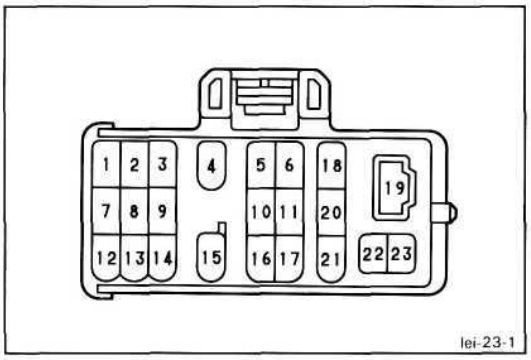
Check for	Tester Connection	Condition		Specified value
Continuity	3 — Ground 11 — Ground	Main Tank Fuel Level	Full	No Continuity
			Below 3/4	Continuity
	6 — Ground	Constant		Continuity
	7 — Ground	Sub-Fuel Switch	OFF	No Continuity
			ON (Pushed)	Continuity
	13 — Ground	Sub Tank Fuel Level	Empty	Continuity
			above 1/4	No Continuity
	15 — Ground	Constant		No Continuity
		Terminals T_C and E_1 connected		Continuity
	16 — Ground	Constant		Continuity
	17 — Ground	Constant		Continuity
	18 — Ground	Constant		Continuity
	2 — Ground	Constant		Battery Voltage
	4 — Ground 5 — Ground	Ignition Switch Position	Lock or ACC	No Voltage
			ON	Battery Voltage
	10 — Ground	Ignition Switch Position	Lock or ACC	No Voltage
			ON	Battery Voltage
	12 — Ground	Ignition Switch: ON and Main Tank Fuel Level	Full	Below 1V
			Below 1/4	Above 3 V
	14 — Ground	Ignition Switch Position	ON	Approx 1 V
			ON (Engine running)	Battery Voltage

If circuit is as specified, try other ECU.

DIAGNOSIS SYSTEM

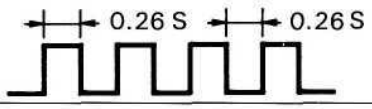
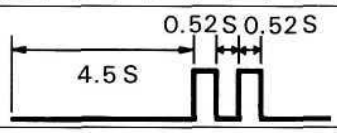
READ DIAGNOSTIC CODE

When there is a malfunction in the extra (sub) tank system, the warning light light up.



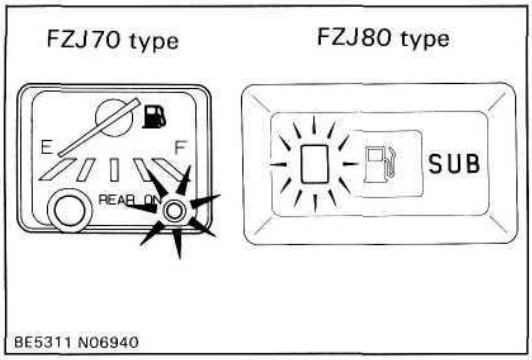
OUTPUT OF DIAGNOSTIC CODE

1. Turn the ignition switch ON.
2. Connect terminals T_c and E_n of the check connector.
3. Read the diagnostic code from the warning light.

	Indication Code	Diagnosis
	0.26 S 0.26 S  N06713	Normal
2	0.52 S 0.52 S 4.5 S  N06746	• Fuel level switch malfunction (Main tank) • Open in switch circuit
3	 N06747	• Main tank sender gauge malfunction
4	 N06748	• Fuel pump malfunction • Open or short in pump circuit
5	 N06749	• Fuel solenoid valve malfunction • Open or short in solenoid valve circuit

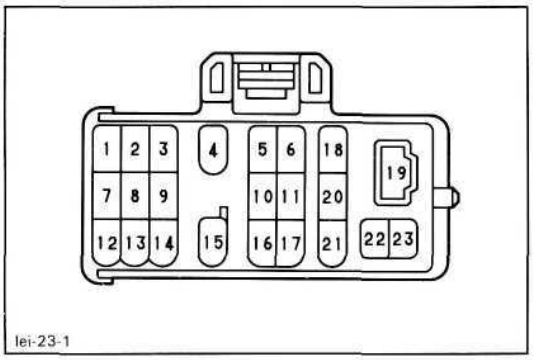
Diagnostic code clearance

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



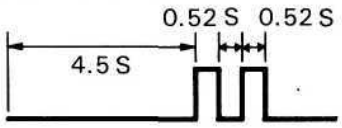
READ TEST CODE

The indicator light outputs the indication codes shown below in conformity with signals input or output by the extra (sub) tank system.



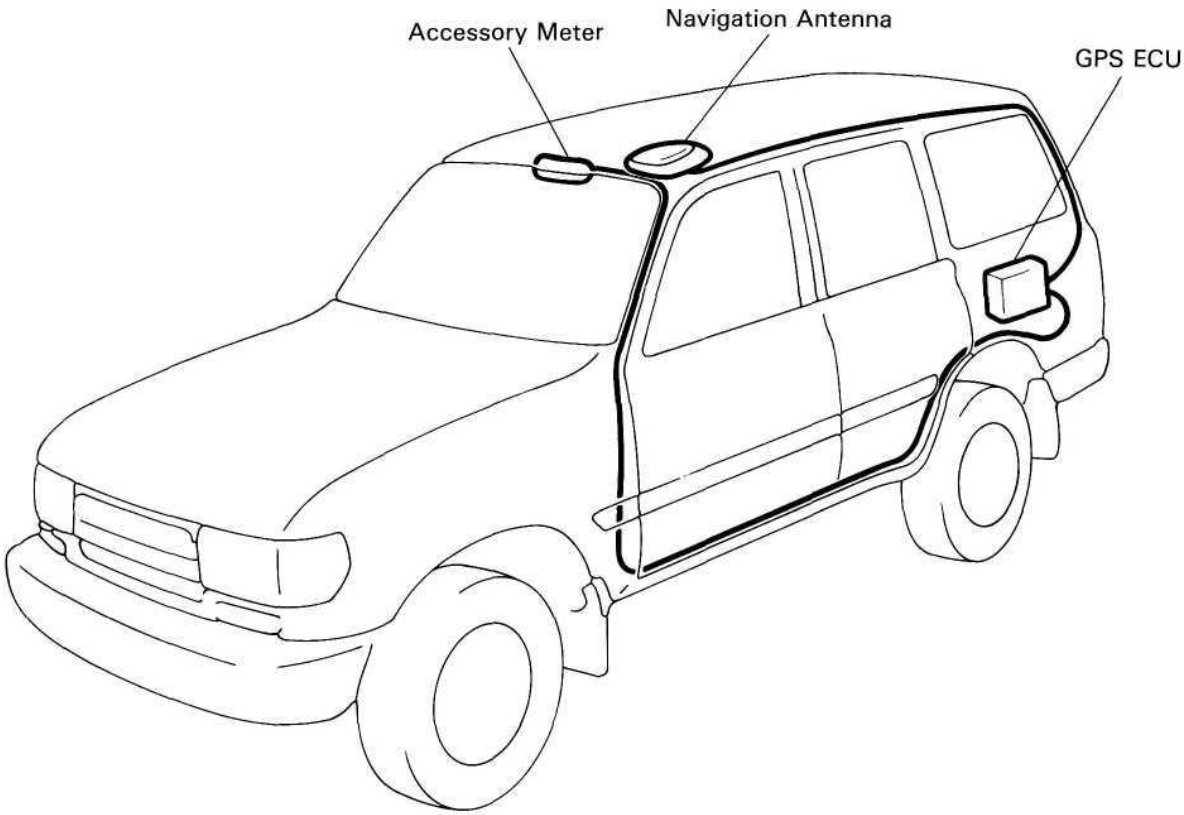
OUT PUT OF TEST CODE

1. Turn the ignition switch ON.
2. Connect terminals T_c and E_n of the check connector.
3. Read the test code from the indicator light.

	Indication code	Condition indicated by signal input/output
2	 N06746	• Fuel level switch signal open or (Main tank) fuel level high.
3	 N06747	• Fuel sender gauge signal open or fuel level high.
4	 N06748	• Open or short in fuel pump circuit.
5	 N06749	• Open or short in fuel solenoid valve circuit.
6	 N06941	• Fuel level switch open or fuel level high. (Extra or sub tank)
—	 N06713	• Condition other than the above.

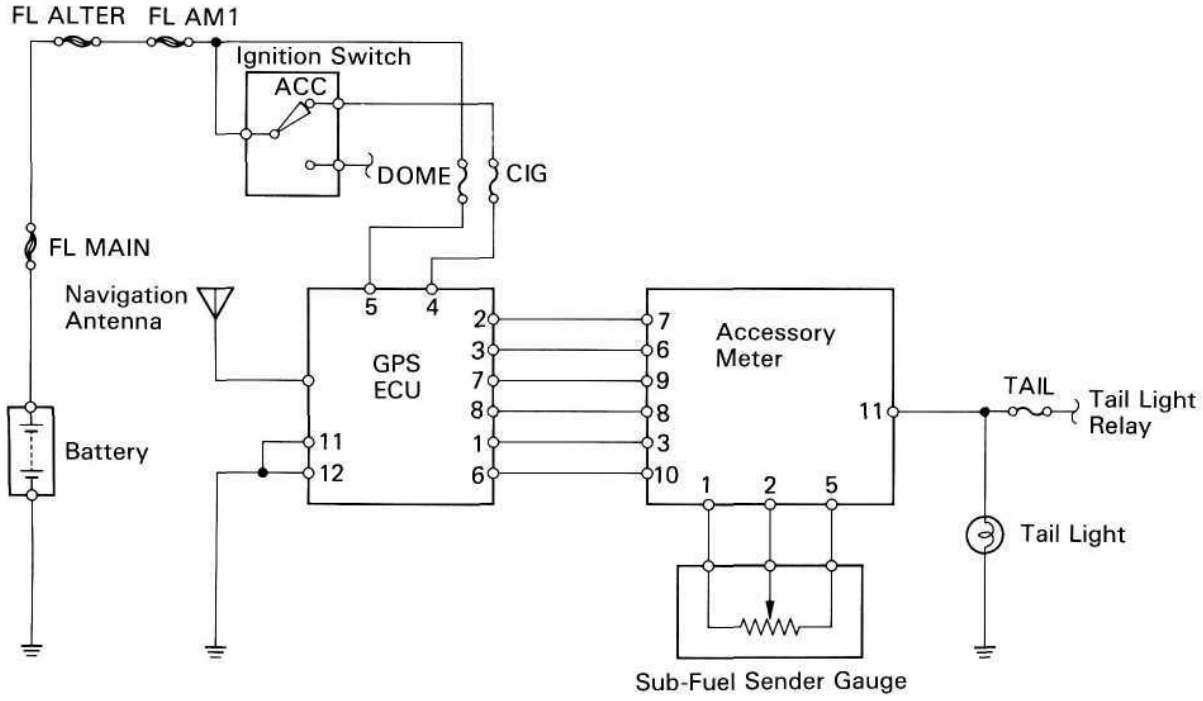
SATELLITE NAVIGATION SYSTEM

PARTS LOCATION



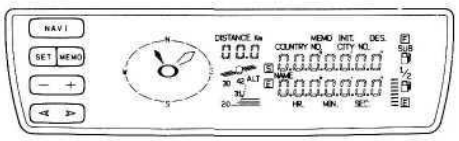
N06717

WIRING DIAGRAMS



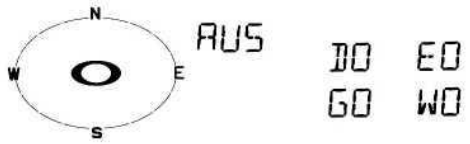
N06718

Display



N06710

Display example



N06711

DIAGNOSIS SYSTEM

OUTPUT OF DIAGNOSTIC CODE

READ DIAGNOSTIC CODE

DO THE FOLLOWING STEPS TO READ DIAGNOSTIC CODE

(a) Turn the ignition switch ACC or ON.

(b) Push "NAVI" or "SET".

(c) Push "NAVI" and "SET" simultaneously for 5 seconds.

(d) Display the condition of each system on the screen.

If a malfunction code is displayed, check it again using other parts.

Display	Diagnosis
D_O E_O G_O W_O	Normal
D_1	• Display malfunction
E_1	• GPS ECU malfunction
G_1	• GPS antenna malfunction • Antenna cable faulty
W_1	• Malfunction in wire harness between GPS ECU and display.