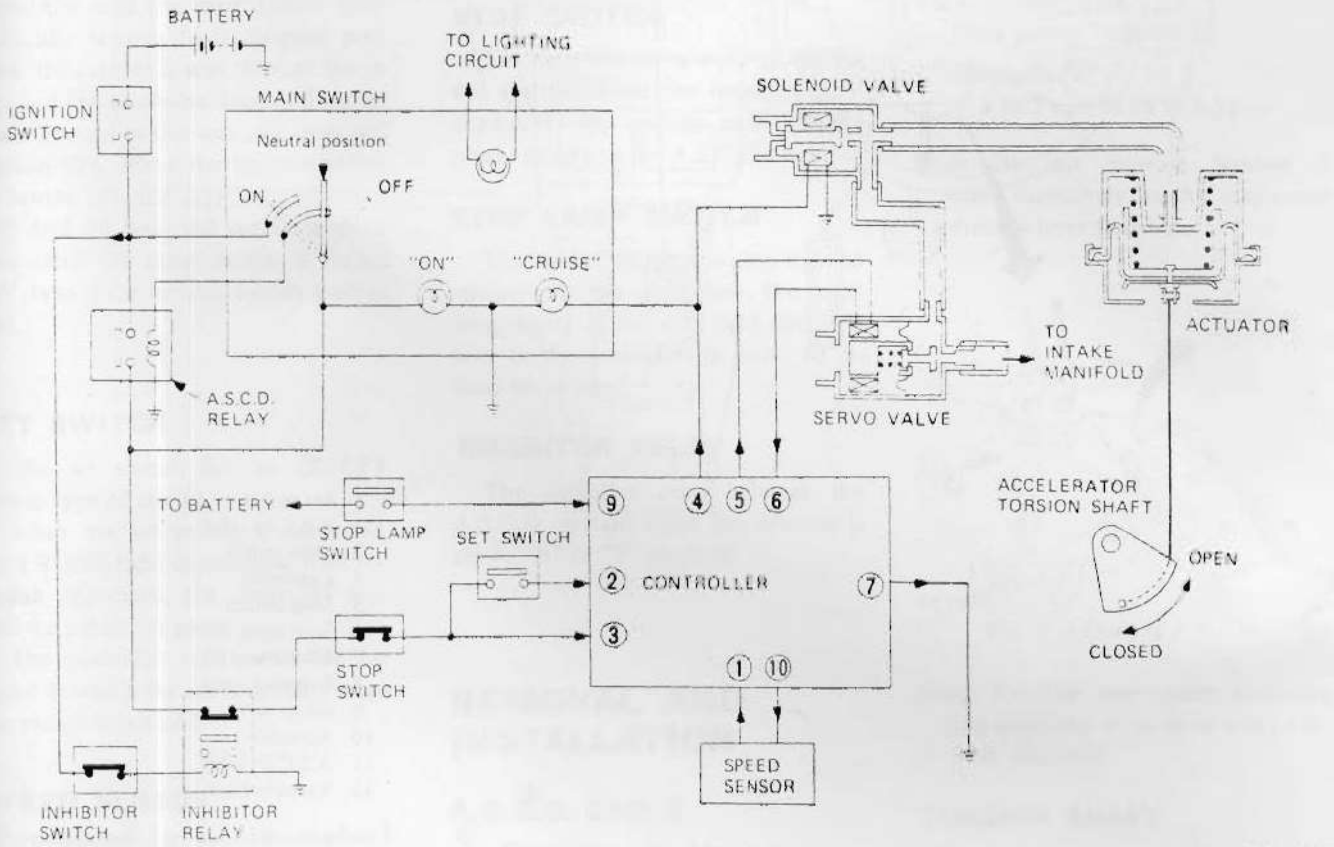
AUTOMATIC SPEED CONTROL DEVICE (A.S.C.D.)

Contents Page No.

AUTOMATIC SPEED CONTROL DEVICE (A.S.C.D.)

CAUTION: Before starting to work on any part of electrical system, disconnect battery ground cable.



BE718D

Fig. 1 A.S.C.D. System Diagram

DESCRIPTION

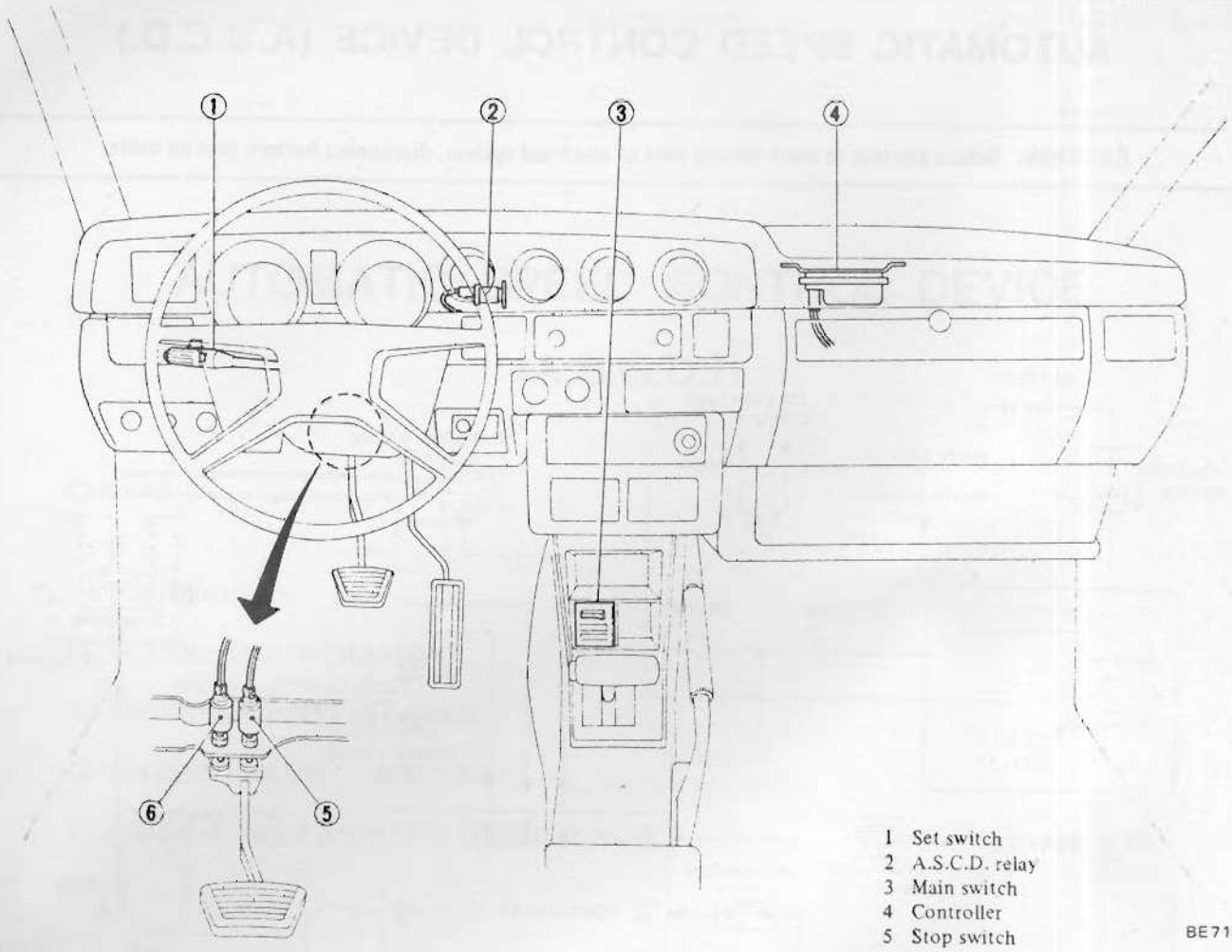
The Automatic Speed Control Device (subsequently referred to as "A.S.C.D.") is a combined unit of electronic circuits with vacuum mechanisms.

The construction of this system and the location of each component part are shown in Figs. 1 and 2.

The A.S.C.D. controller generates an electrical signal equivalent to the difference between the preset speed and the actual speed picked up by the speed sensor.

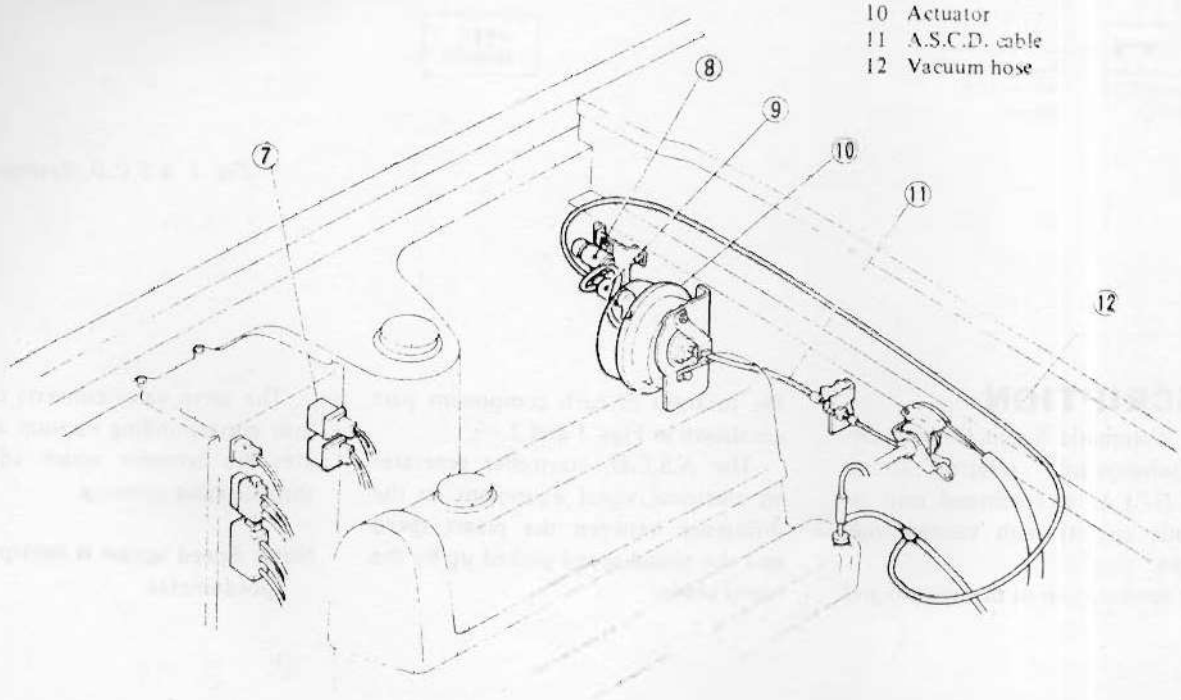
The servo valve converts this signal into corresponding vacuum and operates the actuator which adjusts the throttle valve opening.

Note: Speed sensor is incorporated in speedometer.



1 Set switch
2 A.S.C.D. relay
3 Main switch
4 Controller
5 Stop switch
6 Stop lamp switch
7 Inhibitor relay
8 Solenoid valve
9 Servo valve
10 Actuator
11 A.S.C.D. cable
12 Vacuum hose

BE719D



BE720D

Fig. 2 Component Parts and Locations

FUNCTION AND OPERATION

MAIN SWITCH

The main switch has a holding type of circuit.

When the main switch is turned ON with the ignition switch ON (Fig. 1), the exciting coil of the relay will be energized and the relay will turn ON, thus supplying current to the system. Although the main switch automatically returns to its original position, the current is sent through the relay and fed to the exciting coil via the main switch; in this way, the relay will remain ON. When the ignition switch is turned off, the relay will also turn off. And the relay will remain inoperative until the main switch is turned ON, even if the ignition switch is set to ON.

SET SWITCH

The set switch has an ON-OFF switch type of circuit.

When the set switch is depressed, the CRUISE light illuminates. With the switch depressed, the controller cancels the preset car speed.

The controller will preset the car speed at which the car is running when the switch is released.

SPEED SENSOR (Contained in speedometer)

The speed sensor is an ON-OFF type sensor generating two pulses per revolution of the meter cable.

SERVO VALVE (Transducer)

The servo valve causes the vacuum valve and atmospheric valve to open or close according to the input current and adjusts the vacuum from the intake manifold.

CONTROLLER

The controller compares the preset speed with the actual car speed, and maintains the preset speed by increasing or decreasing the current flowing through the servo valve.

SOLENOID VALVE

The solenoid valve is the safety valve which shuts off the atmospheric passage to the vacuum line, when the system activates.

ACTUATOR

The actuator causes the throttle to open and close, by vacuum, through the servo valve.

STOP SWITCH

The stop switch is used to release the system. When the brake pedal is depressed, this switch cuts off the power supply to the A.S.C.D. circuit.

STOP LAMP SWITCH

This switch causes the stop light to operate. At the same time, the operating signal of the stop light circuit is sent to the controller in order to release the system.

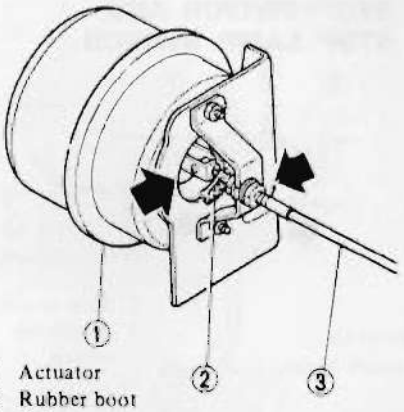
INHIBITOR RELAY

The inhibitor relay releases the A.S.C.D. system when the selector is set to "N" or "P" position.

REMOVAL AND INSTALLATION

A.S.C.D. CABLE

1. Disconnect cable from actuator.
(1) Loosen lock nut attaching cable bracket.
(2) Remove rubber boots.



1 Actuator
2 Rubber boot
3 Cable

BE721D

Fig. 3 A.S.C.D. Cable

2. Loosen lock nut and remove cable from torsion shaft.
3. To install the cable, reverse the order of removal.

Adjustment

When installing, adjust A.S.C.D. cable as follows:

With throttle in idling conditions, adjust adjusting nut ① so that clearance "A" is specified value with no slack of cable.

Then tighten lock nut ②.

Clearance "A":
2 to 3 mm (0.08 to 0.12 in)

Note: Do not increase tension of cable excessively, as this may cause throttle lever to rotate.

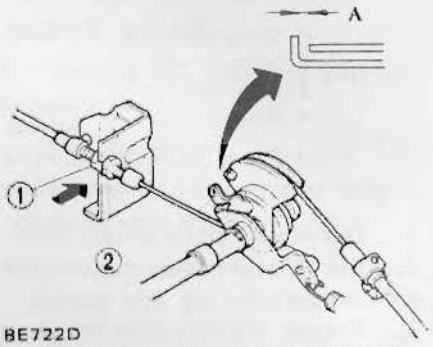


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Fig. 4 Adjusting A.S.C.D. Cable

Note: Exercise care when removing and installing wire, so as not to deform wire end.

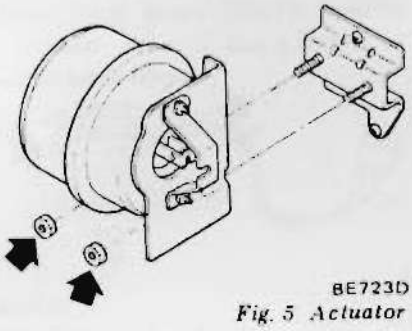
TORSION SHAFT

Refer to Accelerator Linkage for removal (Section FE).

ACTUATOR

1. Disconnect battery ground cable.
2. Disconnect cable from actuator.

Refer to A.S.C.D. cable for removal.

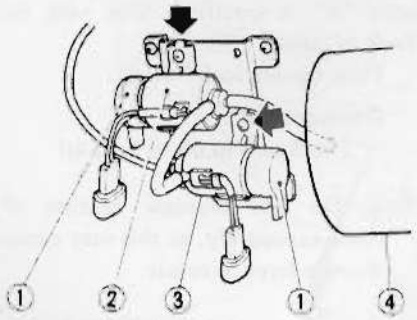


BE723D

Fig. 5 Actuator

3. Disconnect vacuum hose from actuator.
4. Remove nuts attaching actuator to the bracket attached on body.
5. To install actuator, reverse the order of removal.

SOLENOID VALVE AND SERVO VALVE



1 Water-tight cover
2 Solenoid valve
3 Servo valve
4 Actuator

BE724D

Fig. 6 Solenoid Valve and Servo Valve

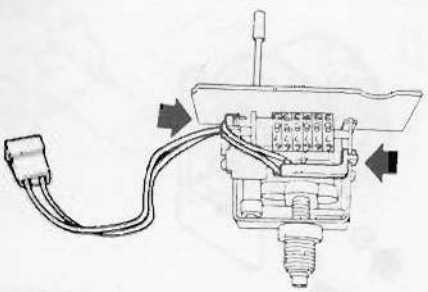
1. Disconnect battery ground cable.
2. Disconnect harness connector and vacuum hoses.
3. Remove solenoid valve and servo valve.
4. To install the valve, reverse the order of removal.

Note: Install valve so that water drain of water-tight cover faces downward.

SPEED SENSOR

The speed sensor is built into the combination meter.

1. Disconnect battery ground cable.
2. Remove speedometer, referring to Section BE of Service Manual.
3. Remove speed sensor by removing harness retaining screw.



BE725D

Fig. 7 Speed Sensor

4. To install the sensor, reverse the order of removal.

MAIN SWITCH

1. Disconnect battery ground cable.
2. Remove console box.
3. Disconnect harness connector.
4. Push out main switch from behind console box.

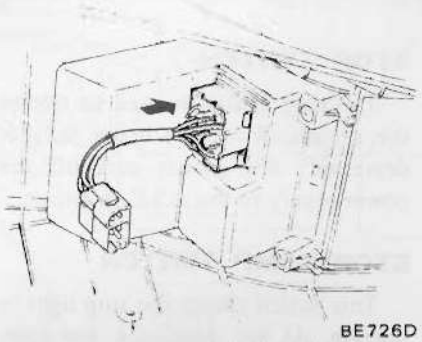


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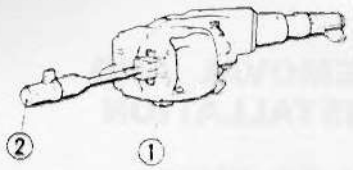
Fig. 8 Main Switch

5. To install the switch, reverse the order of removal.

SET SWITCH

Remove set switch as an assembly as it is built into combination switch.

Refer to Combination Switch for removal.



1 Combination switch assembly
2 Set switch

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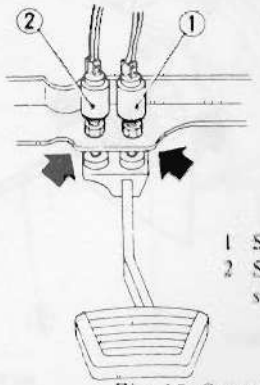
Fig. 9 Set Switch

STOP SWITCH AND STOP LAMP SWITCH



1 Stop switch
2 Stop lamp switch

BE727D

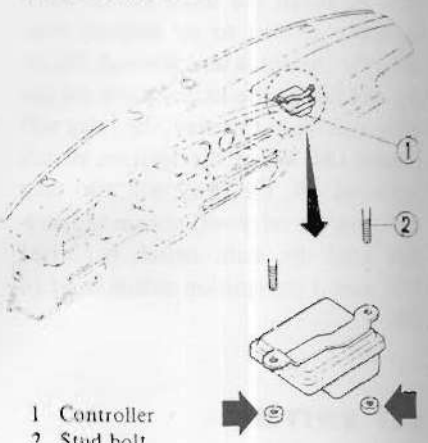
Fig. 10 Stop Switch and Stop Lamp Switch

1. Disconnect battery ground cable.
2. Loosen lock nut and remove switch.
3. To install switch, reverse the order of removal.

Adjustment

Refer to Brake Pedal for adjustment (Section BR of Service Manual).

CONTROLLER



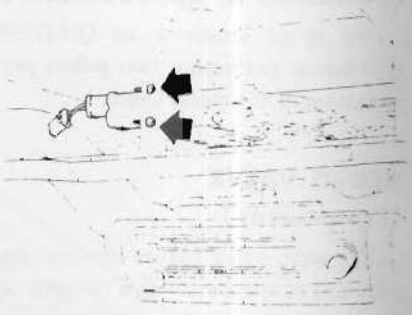
1 Controller
2 Stud bolt

BE728D

Fig. 11 Controller

1. Disconnect battery ground cable.
2. Remove glove box.
3. Remove controller from instrument panel.
4. To install controller, reverse the order of removal.

A.S.C.D. RELAY



BE729D

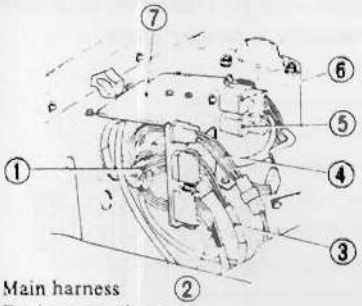
Fig. 12 A.S.C.D. Relay

1. Disconnect battery ground cable.
2. Remove cluster lid.

Refer to Combination Meter for removal.

3. Remove A.S.C.D. relay.
4. To install the relay, reverse the order of removal.

INHIBITOR RELAY (For A.S.C.D.)



1 Main harness
2 Engine room harness
3 Engine harness No. 2
4 Fusible link
5 Bulb check relay
6 Inhibitor relay
7 Relay bracket

BE195D

Fig. 13 Inhibitor Relay

1. Disconnect battery ground cable.
2. Remove relay cover.
3. Remove relay from relay bracket.
4. To install relay, reverse the order of removal.

COMPONENT PARTS INSPECTION

CAUTION:
a. Do not disassemble component parts when checking as all of them are replaced as assemblies.
b. When checking by using battery or circuit tester, be careful not to touch adjacent terminal at the same time. Extreme care must be taken in handling controller.

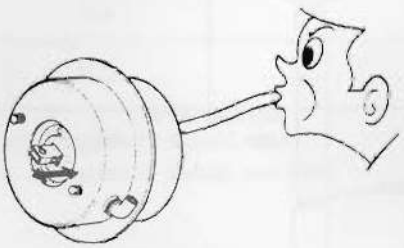
A.S.C.D. CABLE AND TORSION SHAFT

Visually check A.S.C.D. cable and torsion shaft for rust, damage or looseness.

ACTUATOR

1. Visually check actuator for damage or deformation.
2. Make sure that actuator moves smoothly without binding when diaphragm is pushed by hand.
3. Apply vacuum to actuator. If diaphragm moves to full position, it is normal.

Plug hose with vacuum applied. Make sure that actuator remains in full position.



BE100D

Fig. 14 Actuator

CAUTION:
When checking actuator by applying vacuum, do not apply engine vacuum directly.

SOLENOID VALVE

1. Measure the resistance between terminals.

25 to 30 ohms . . . . . OK

2. Check to be sure that the valve opens or closes by blowing air through port on actuator side.

Battery 12V

1 Actuator side
2 Servo valve side
3 Atmosphere side

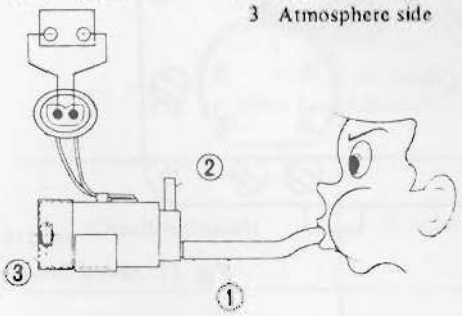


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Fig. 15 Solenoid Valve

(1) Normal condition.

Check ports	Air flow
① - ② ① - ③ ② - ③	Yes

(2) 12V direct current is applied between terminals.

Check ports	Air flow
① - ②	Yes
① - ③ ② - ③	No

SERVO VALVE

1. Measure the resistance between terminals.

25 to 30 ohms . . . . . OK

2. Check to be sure that output vacuum of valve is proper.

Note: This check should be performed with the valve installed on car.

CAUTION:
With servo valve connected to system, do not apply current to servo valve. Be sure to disconnect solenoid valve side vacuum hose.

(1) Disconnect solenoid valve side vacuum hose at solenoid valve and connect vacuum gauge.
(2) Start engine and warm up engine until water temperature indicator points to the middle of gauge.
(3) Apply 0.3A direct current between terminals.

Note: Using about 20Ω-5W variable resistor, adjust so that a current of 0.3A will flow.

(4) Read vacuum gauge.

55 to 85 mmHg
(2.17 to 3.35 inHg) . . . . . OK

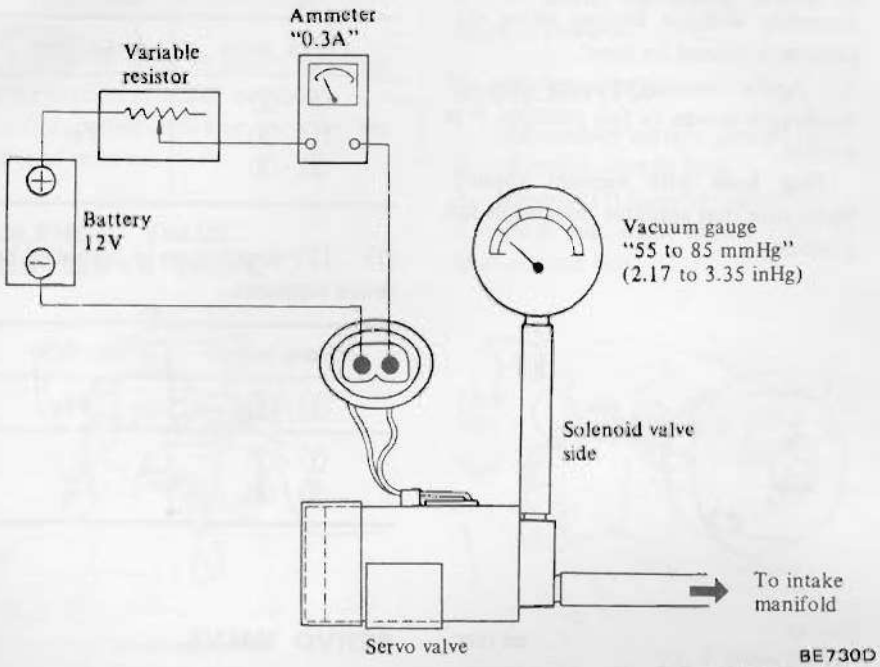


Fig. 16 Servo Valve

SPEED SENSOR

Note: Inspection must be made with speed sensor installed to combination meter.

Turning speedometer slowly by hand, test continuity of speed sensor circuit.

Continuity exists two times a turn . . . . . OK

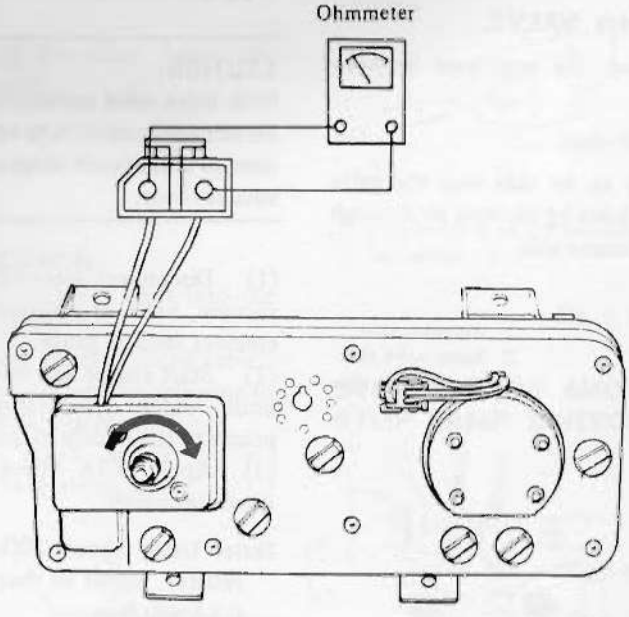
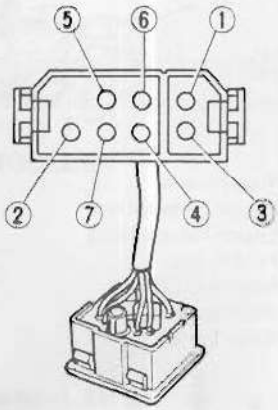


Fig. 17 Speed Sensor

MAIN SWITCH

Test continuity through switch or light with an ohmmeter in accordance with the following chart.



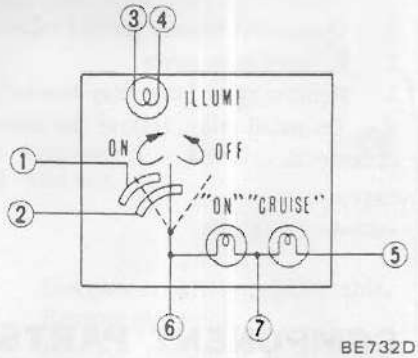


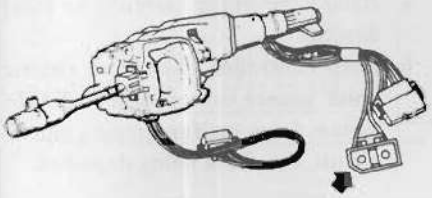
Fig. 18 Main Switch

Switch position / Check terminal	Normal	ON	OFF
① – ②	No	Yes	No
① – ⑥	No	Yes	No
② – ⑥	Yes	Yes	No
③ – ④	Yes	–	–
⑤ – ⑦	Yes	–	–
⑥ – ⑦	Yes	–	–

Yes: Continuity should exist.
No: Continuity should not exist.

SET SWITCH

Test continuity through switch with an ohmmeter.



BE107D

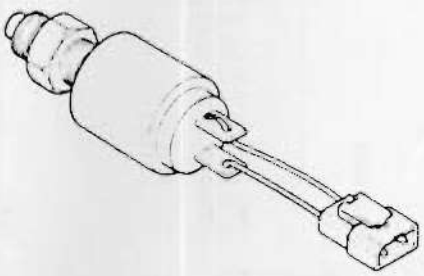
Fig. 19 Set Switch

Normal condition	Depress switch
No	Yes

Yes: Continuity should exist.
No: Continuity should not exist.

STOP SWITCH

Test continuity through switch with an ohmmeter.



BE733D

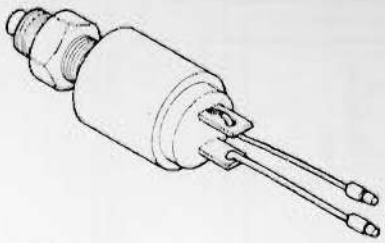
Fig. 20 Stop Switch

Normal condition	Push plunger
No	Yes

Yes: Continuity should exist.
No: Continuity should not exist.

STOP LAMP SWITCH

Test continuity through switch with an ohmmeter.



BE734D

Fig. 21 Stop Lamp Switch

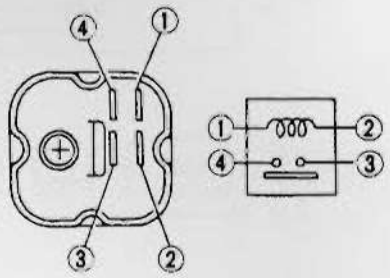
Normal condition	Push plunger
Yes	No

Yes: Continuity should exist.
No: Continuity should not exist.

RELAY

Test continuity through relay with an ohmmeter in accordance with the following chart.

A.S.C.D. relay



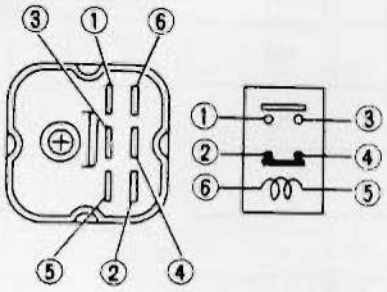
BE108D

Fig. 22 A.S.C.D. Relay

Check terminals	Normal condition	12V direct current is applied between terminals ① and ②
① – ②	Yes	–
③ – ④	No	Yes

Yes: Continuity should exist.
No: Continuity should not exist.

Inhibitor relay (For A.S.C.D.)



BE109D

Fig. 23 Inhibitor Relay (For A,S.C.D.)

Check terminals	Normal condition	12V direct current is applied between terminals ⑤ and ⑥
⑤ – ⑥	Yes	–
② – ④	Yes	No
① – ③	No	Yes

Yes: Continuity should exist.
No: Continuity should not exist.

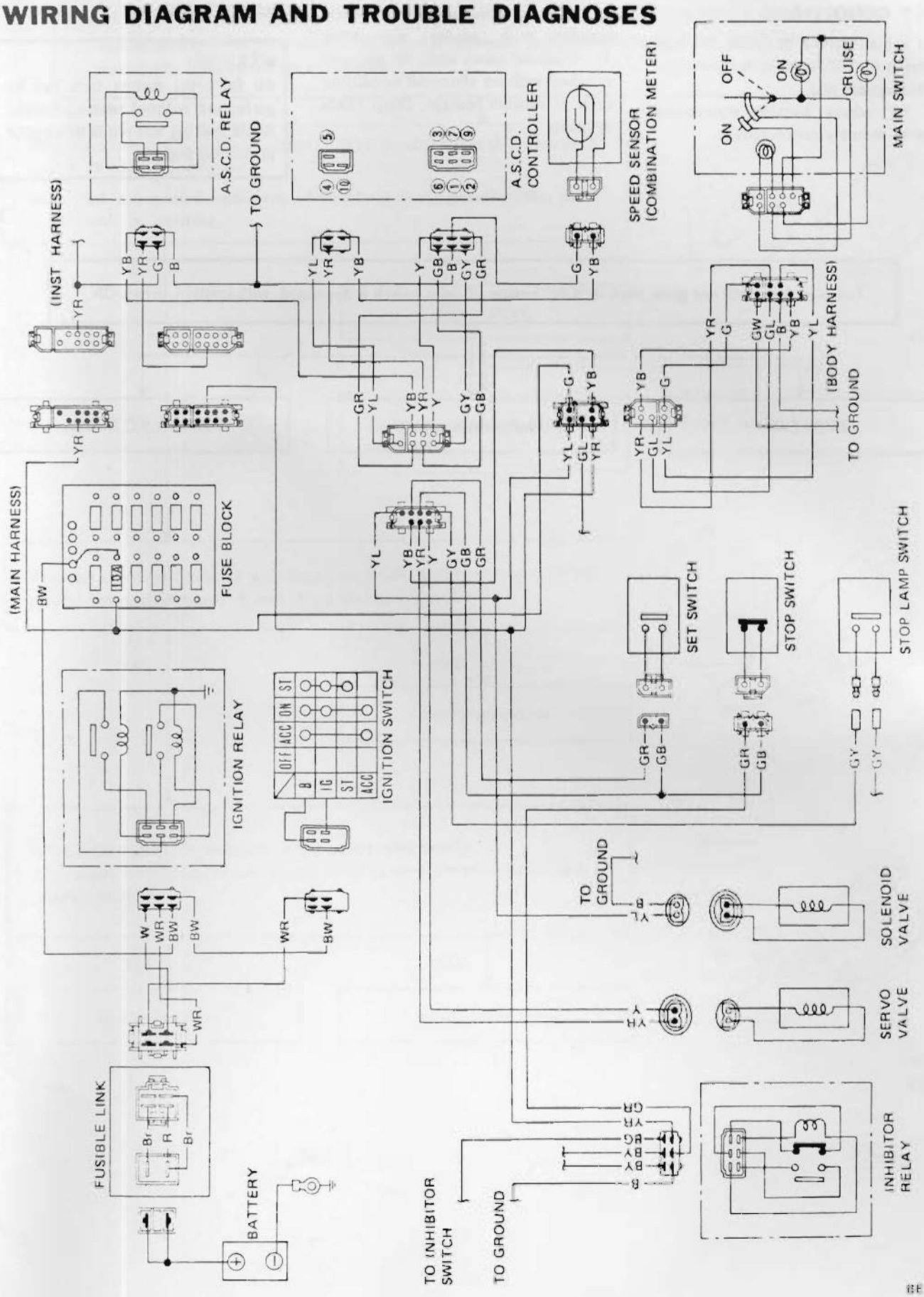
CONTROLLER

Controller must not be checked as a single part. Check controller for operation as a system, referring to Diagnosis.

CAUTION:
Do not touch the circuit tester probe to any unnecessary terminal on controller. Doing so could cause damage to controller.

Note:
a. Handle controller carefully to avoid damage.
b. Keep controller away from electric noise source to prevent A.S.C.D. system from malfunctioning and IC circuit, etc. from being degraded.

WIRING DIAGRAM AND TROUBLE DIAGNOSES



BE7350

Fig. 24 Wiring Diagram for A.S.C.D.

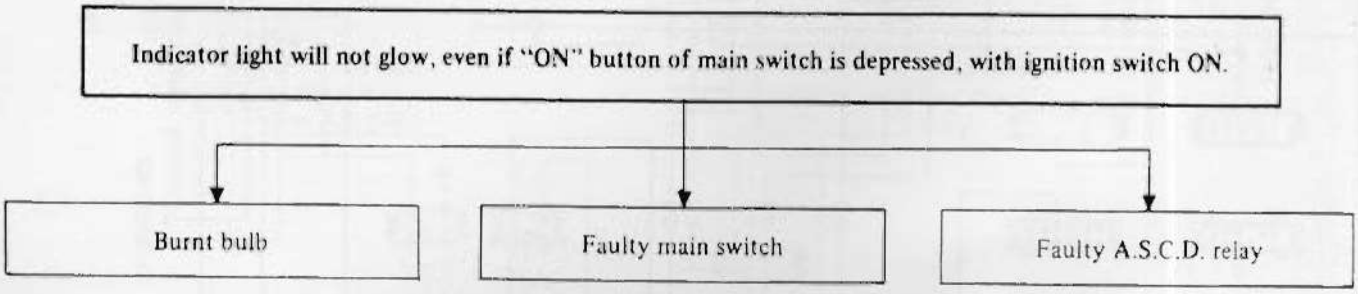
TEST CONDITIONS

If a malfunction is found, be sure to check the following before performing the system test.

1. All wiring harness connectors must be securely connected.
2. A.S.C.D. cable must be securely installed with proper adjustment.
3. Vacuum hoses must be properly attached with no abnormal conditions such as vacuum leakage, sharp bends or kinks.

DIAGNOSES

WARNING:
All following system tests can be performed without running engine. Avoid making test while driving car or running engine.



Cruise light will not glow, even if set switch is depressed and released at proper car speed, with main switch ON. (Speed not set in system.)

With main switch ON, battery voltage (12V) is present between terminals ③ and 7 of harness connector.

Note: Set automatic transmission selector lever at any position other than "P" and "N" position.

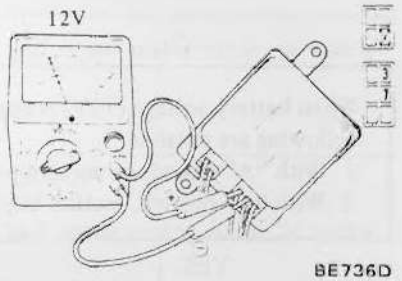
YES

NO

Open circuit

Faulty or improperly adjusted stop switch

Faulty inhibitor switch.



BE736D

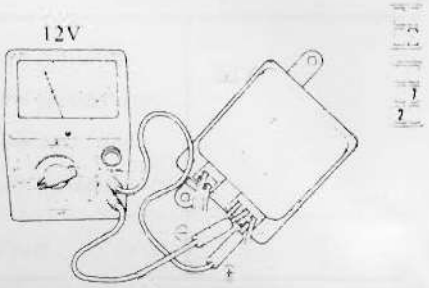
Fig. 25

When set switch is depressed with main switch ON, battery voltage (12V) is present between terminals 2 and 7 of harness connector.

YES

NO

Faulty set switch



BE737D

Fig. 26

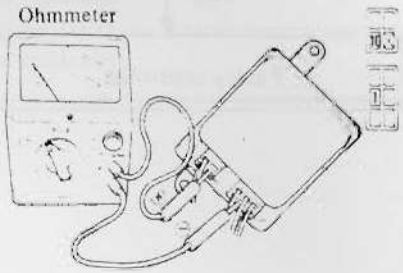
With main switch ON, manually rotate meter cable slowly. Continuity between terminals 1 and 10 of harness connector exists two times a rotation.

YES

NO

Faulty controller

Faulty speed sensor



BE738D

Fig. 27

Cruise light illuminates when speed setting operation is made, but speed is not actually set.

When battery voltage (12V) is applied to the solenoid valve terminal, the following are possible:
1. With "A" closed, no suction possible at "B".
2. With "A" opened, suction begun at "B".

YES

NO

Faulty solenoid valve

Servo valve operates normally. (Refer to Servo Valve for Inspection.).

YES

NO

Faulty servo valve

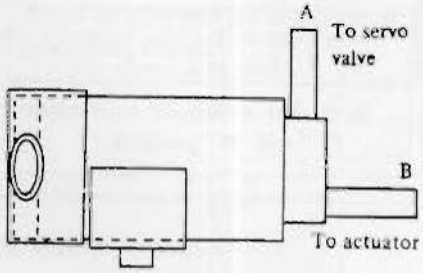
Actuator operates smoothly when actuator vacuum port is suctioned. (This operation must be performed with A.S.C.D. cable released.)

YES

NO

Faulty controller

Faulty actuator



BE089D

Fig. 28

Other Malfunctions and Faults

Condition	Probable cause	Corrective action
Set speed is cancelled.	• Bent meter cable (excessive meter needle deflection.) • Faulty controller	• Check and repair meter cable, or renew cable. • Renew.
Pulsation of set speed	• Excessive play or binding of A.S.C.D. cable • Leakage or clogging in vacuum hose • Binding in actuator • Faulty servo valve • Faulty controller	• Adjust. • Check and repair piping route, or renew hose. • Renew actuator. • Renew servo valve. • Renew controller.
Excessive setting error	• Excessive play or binding in A.S.C.D. cable • Leakage or clogging in vacuum hose • Faulty actuator • Faulty servo valve • Faulty controller • Faulty speed sensor	• Readjust. • Check and repair piping route, or renew hose. • Renew actuator. • Renew servo valve. • Renew controller. • Renew speed sensor.
Speed drops immediately after setting	• Excessive play in A.S.C.D. cable • Leakage or clogging in vacuum hose • Faulty solenoid valve • Faulty servo valve • Faulty controller	• Readjust. • Check and repair piping route, or renew hose. • Renew solenoid valve. • Renew servo valve. • Renew controller.
Cancel circuit inoperative	• Faulty controller	• Renew controller.

NOTE: For wiring diagram, use 1980 810 Service Manual.