

CRUISE CONTROL SYSTEM

1992 Subaru SVX

1990-92 SAFETY EQUIPMENT
Subaru Cruise Control Systems

Legacy & SVX

DESCRIPTION & OPERATION

Throttle plate position is controlled by vacuum-powered actuator mounted on engine compartment firewall. Vacuum supply to actuator is controlled by valve and pump assembly that contains a vacuum pump motor, vent valve and safety valve. See ELECTRICAL COMPONENT LOCATIONS table. Valve and pump assembly receives commands from solid-state cruise control unit. Cruise control unit receives inputs from the following components:

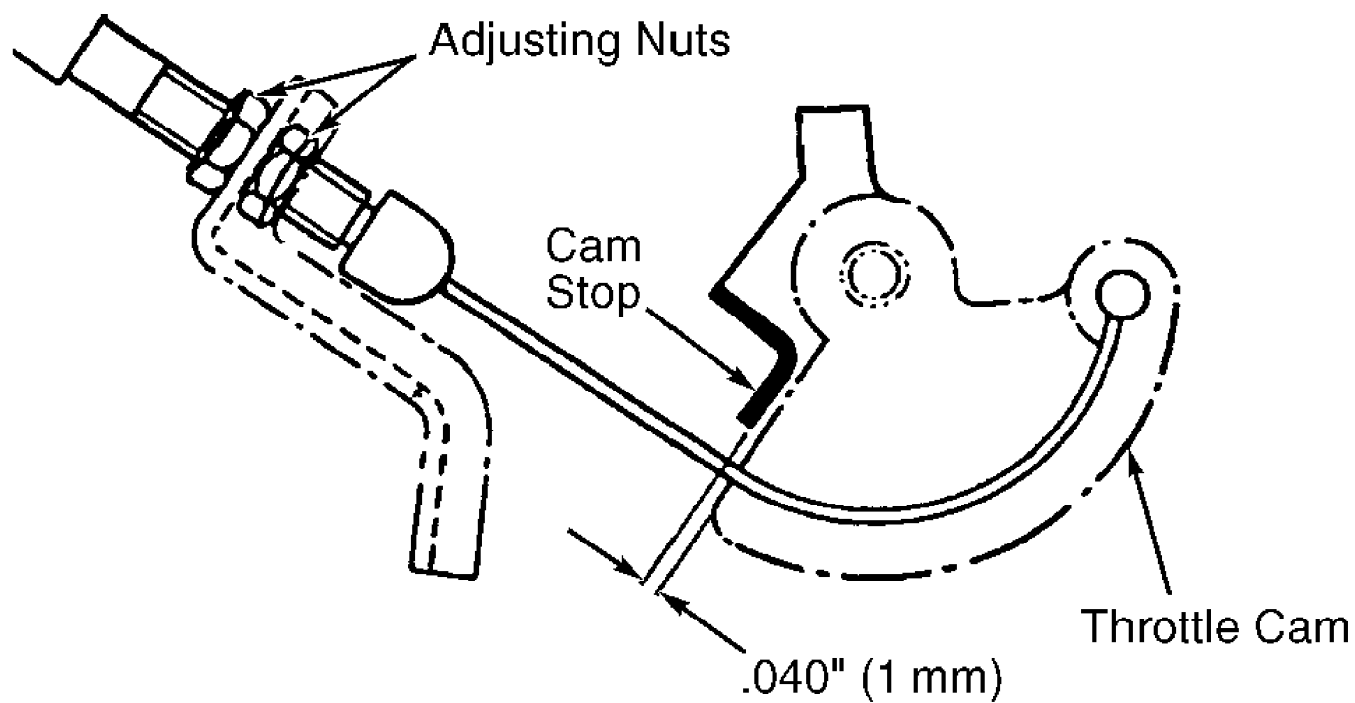
- * Main Switch On Instrument Panel
- * Cruise Control Main Relay
- * Speedometer (Legacy) Or Vehicle Speed Sensor (SVX)
- * Control Switch (Sub-Switch) Containing RESUME And SET Switches (And CANCEL Switch On Vehicles With Air Bag)
- * Multi-Point Fuel Injection (MPFI) Control Unit (Provides Engine RPM Signal)
- * Brakelight Switch
- * Inhibitor Relay (A/T)
- * Clutch Switch (M/T).

ELECTRICAL COMPONENT LOCATIONS

Component	Location
Brakelight Switch	On Brake Pedal Bracket
Clutch Switch (M/T)	On Clutch Pedal Bracket
Cruise Control Unit	Behind Far Right End Of Instrument Panel, Accessible With Glove Box Removed
Inhibitor Relay (A/T)	Next To Cruise Control Unit
Main Relay	Next To Cruise Control Unit
MPFI Control Unit	Behind Far Left End Of Instrument Panel
Valve & Pump Assembly	
Legacy	On Right Front Strut Tower
SVX	Near Battery
Vehicle Speed Sensor	
Legacy	Part Of Speedometer
SVX	On Transmission

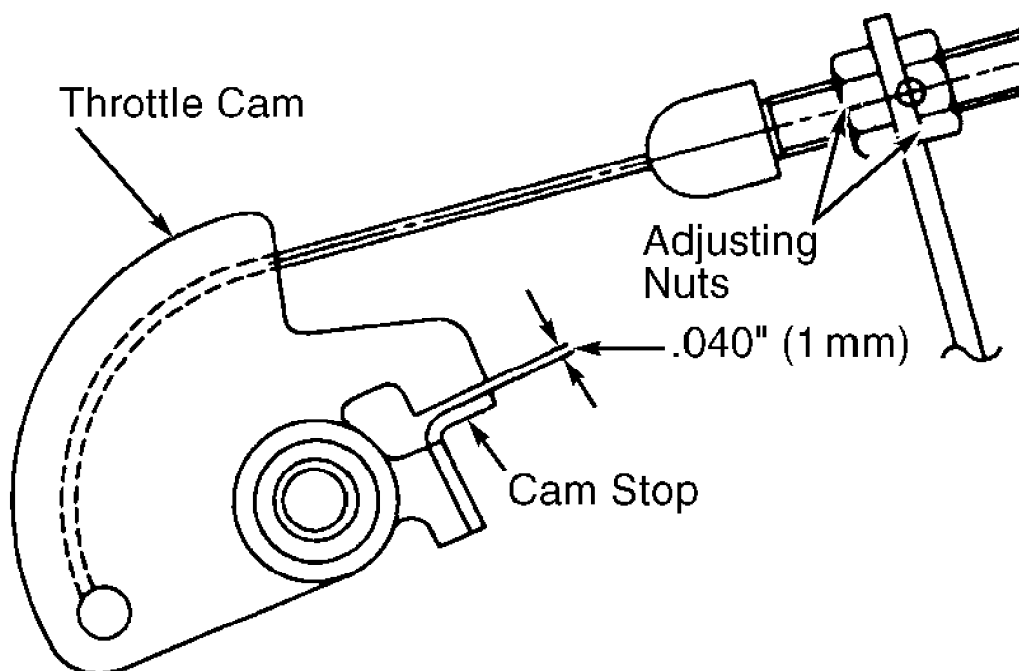
CRUISE CONTROL CABLE ADJUSTMENT

Check clearance between cruise control cable throttle cam and cam stop. See Figs. 1 and 2. If clearance is not .040" (1 mm), loosen adjusting nuts. Move cable sheath toward or away from throttle cam as necessary to adjust clearance. Moving sheath toward cam increases clearance. Moving sheath away from cam reduces clearance.



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Fig. 1: Adjusting Cruise Control Cable (Legacy)
 Courtesy of Subaru of America, Inc.



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Fig. 2: Adjusting Cruise Control Cable (SVX)
 Courtesy of Subaru of America, Inc.

CLUTCH & BRAKELIGHT SWITCHES ADJUSTMENT

Switch is mounted on pedal support bracket. Loosen switch lock nut. With pedal released, rotate switch until pedal stop pushes switch plunger .059-.118" (1.5-3.0 mm) into switch. Tighten lock nut. Check continuity through switch circuit. See CLUTCH SWITCH and BRAKELIGHT SWITCH under TESTING.

TROUBLE SHOOTING

PRELIMINARY INSPECTION

Cable

Ensure cruise control cable is attached to throttle cam furthest from throttle body. Accelerator cable throttle cam should not move when cruise control cable throttle cam is moved by hand. Ensure cruise control cable is adjusted. See CRUISE CONTROL CABLE under ADJUSTMENTS.

Vacuum Hose

Ensure vacuum hose between actuator and valve and pump assembly is not disconnected or cracked.

Cruise Control Unit Ground Circuit

Turn ignition off. Measure resistance between ground and terminal No. 10 of cruise control unit connector. If resistance is more than one ohm, repair ground circuit.

CRUISE CONTROL SYSTEM WILL NOT SET SPEED

Perform preliminary inspection. See PRELIMINARY INSPECTION under TROUBLE SHOOTING. If no problems were found during preliminary inspection, go to INPUT/OUTPUT (I/O) SIGNALS under TESTING.

DIFFERENCE IN SET SPEED & ACTUAL SPEED

Check vacuum pump and valve assembly. See VACUUM PUMP & VALVE ASSEMBLY under TESTING. If vacuum pump and valve assembly is okay, check ACTUATOR. See ACTUATOR under TESTING. If actuator is okay, replace cruise control unit.

TESTING

WARNING: Air bag system wiring harness, identified by Yellow connectors, is routed near cruise control unit. DO NOT use electrical test equipment on air bag system connectors or harness.

INPUT/OUTPUT (I/O) SIGNALS

Check I/O signals (pin voltage) at cruise control unit connector. See Fig. 4. If I/O signals are not as specified, repair circuit or replace component as necessary.

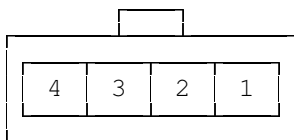
INPUT/OUTPUT SIGNALS TABLE

Content	Connector	Terminal Number	Measuring Conditions & I/O (Ignition Switch On & Engine Idling)
Cruise Control	B81	1	* When main switch is pressed, battery voltage is present; when

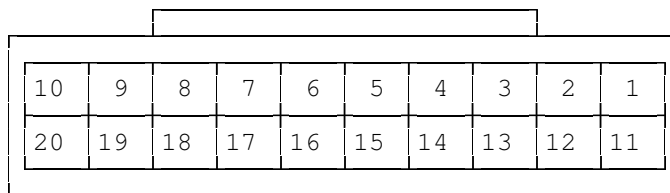
Main Switch			it is released, approximately 6.5 volts are present. * When main switch is OFF, "0" volts are present.
Main Relay (Solenoid)		2	* When main switch is turned ON, indicator comes on and battery voltage is present. * When main switch is turned OFF, "0" volts are present.
Main Relay (Contacts)		4	* When main switch is turned ON, indicator comes on and battery voltage is present. * When main switch is turned OFF, "0" volts are present.
Engine Speed (RPM Signal)		2	When engine starts, a pulse signal is entered (observe using an oscilloscope)
Vehicle Speed Sensor 2		7	When all four wheels are raised off ground and any wheel is rotated manually, approximately 5 and 0 volt pulse signals are alternately sent to cruise control unit.
Brake Switch	B82	15	Set select lever to any position other than "P" or "N" (A/T model) leave clutch released (M/T model), with main switch ON. Then check that: * 0 volts are present when the brake pedal is depressed. * Battery voltage is present when brake pedal is released or, * 0 volts are present when clutch is depressed (M/T model). * Battery voltage is present when clutch pedal is released (M/T model). * 0 volts are present when select lever is set to "P" or "N" (A/T model). * Battery voltage is present when select lever is in any position other than "P" or "N" (A/T model).
Stop Light Switch		20	With ignition switch ON or OFF: * Depress brake pedal to check that battery voltage is present.
SET/COAST Switch		18	* When switch is turned ON, battery voltage is present. * When switch is turned OFF, 0 volts are present.
RESUME/ACCEL Switch		19	* When switch is turned ON, battery voltage is present.

			* When switch is turned OFF, 0 volts are present.
Set Signal		11	ECU emits a ground-level signal while driving vehicle at least 40 km/h (25 MPH) with SET switch ON.
Power Supply To Vacuum Motor, Vent Valve & Safety Valve		14	* 0 volts are present when vehicle is stopped. * Battery voltage is present while cruise control system is operating.
Vacuum Motor Output		8	* Power supply is ON when vehicle is stopped. * ON-and-OFF (0 and 12 volts) operation is alternately repeated while cruise control is operating.
Vent Valve Output		9	* Power supply is ON when vehicle is stopped. * ON-and-OFF (0 and 12 volts) operation is alternately repeated while cruise control is operating.

Voltage at terminal (11, 14, 8 and 9) cannot be checked unless vehicle is driving at cruising speed.



B81



B82

ACTUATOR

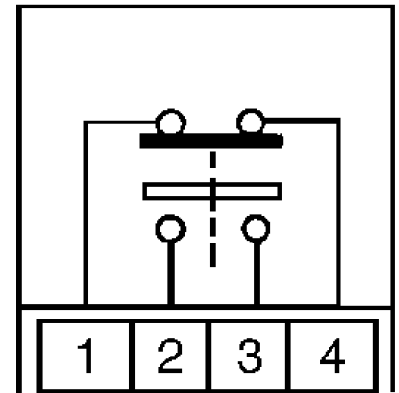
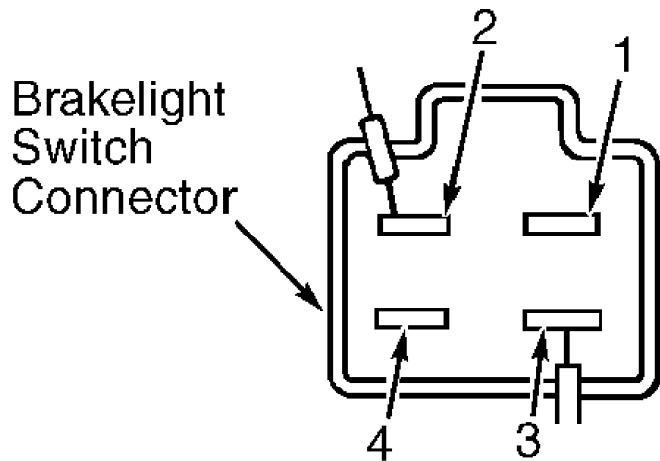
Disconnect vacuum hose from actuator. Apply vacuum to actuator with a hand-held vacuum pump. If throttle does not fully open, replace actuator. If throttle fully opens, disconnect vacuum supply from actuator. If throttle does not close, replace actuator. If throttle closes, actuator is okay.

BRAKELIGHT SWITCH

Disconnect brakelight switch connector. Check continuity between specified terminals of brakelight switch. See BRAKELIGHT SWITCH CONTINUITY TEST table. See Fig. 3. If continuity is not as specified, replace brakelight switch.

BRAKELIGHT SWITCH CONTINUITY TEST

Condition	Terminal Nos.	Continuity
Pedal Depressed	1 & 4	No
Pedal Depressed	2 & 3	Yes
Pedal Released	1 & 4	Yes
Pedal Released	2 & 3	No



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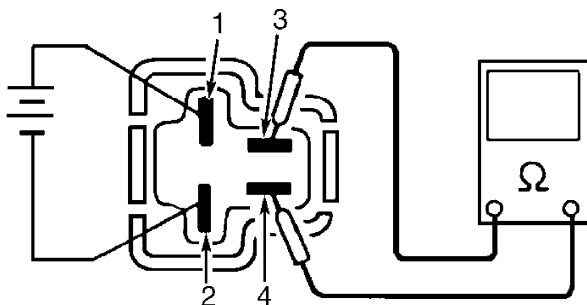
Fig. 3: Identifying Brakelight Switch Connector Terminals
 Courtesy of Subaru of America, Inc.

CLUTCH SWITCH

Disconnect clutch switch connector. With pedal released, there should be continuity between switch terminals. With pedal depressed, there should be no continuity between switch terminals. If continuity is not as specified, replace clutch switch.

CRUISE CONTROL MAIN RELAY

Relay is located behind right end of instrument panel, next to cruise control unit. Remove relay. Apply battery voltage across relay terminals No. 1 and 3. See Fig. 4. Check continuity between terminals No. 2 and 4. If there is no continuity, replace relay.



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Fig. 4: Identifying Cruise Control Main Relay Terminals
 Courtesy of Subaru of America, Inc.

CRUISE CONTROL MAIN SWITCH

Control Circuit (Legacy)

Disconnect switch electrical connector. With switch turned on, there should be continuity between switch connector terminals No. 3 and 5. See Fig. 5. With switch turned off, there should be NO continuity between switch connector terminals No. 3 and 5. If continuity is not as specified, replace switch.

Control Circuit (SVX)

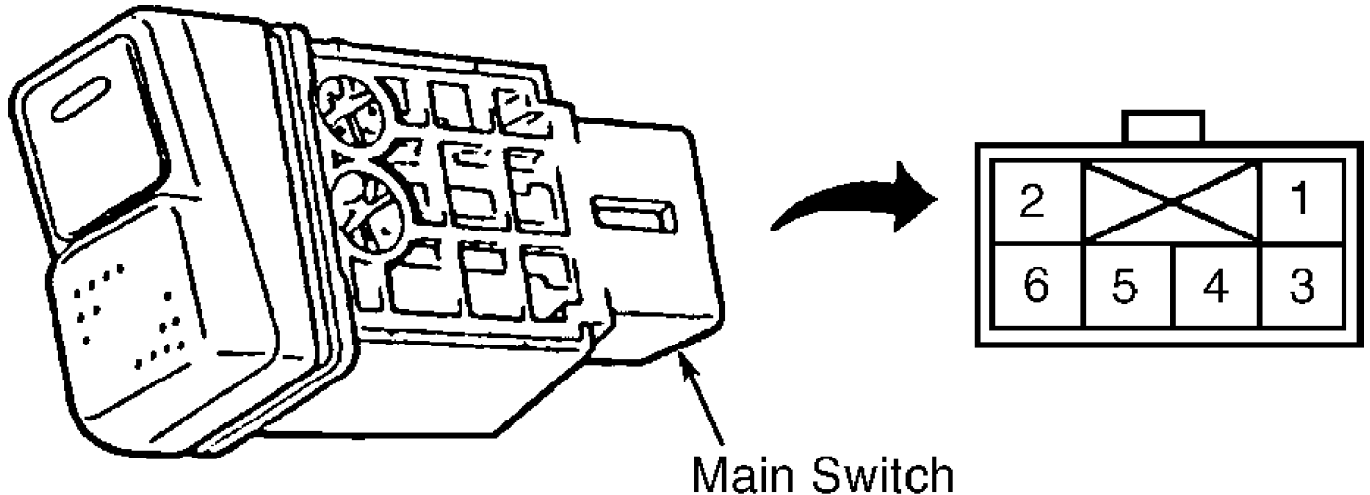
Disconnect switch electrical connector. With switch turned on, there should be continuity between switch connector terminals No. 4 and 9. See Fig. 6. With switch turned off, there should be NO continuity between switch connector terminals No. 4 and 9. If continuity is not as specified, replace switch.

Indicator Light Circuit (Legacy)

Disconnect switch electrical connector. Check resistance between switch connector terminals No. 1 and 6. See Fig. 5. If resistance is not 120 ohms, replace bulb.

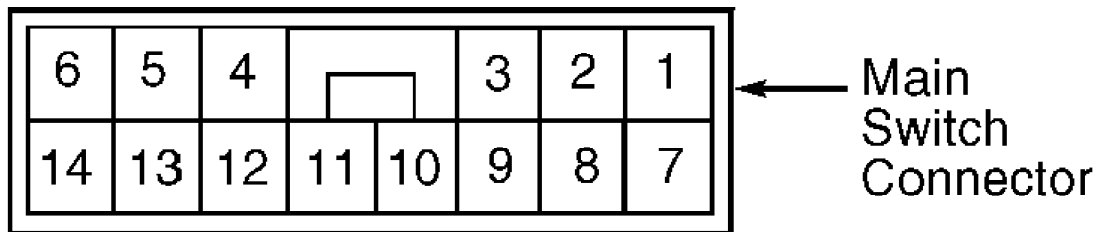
Indicator Light Circuit (SVX)

Disconnect switch electrical connector. Check resistance between switch connector terminals No. 14 (+) and 5 (-). See Fig. 6. If resistance is not 160 ohms, replace bulb.



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Fig. 5: Cruise Control Main Switch Connector Terminal ID (Legacy)
Courtesy of Subaru of America, Inc.

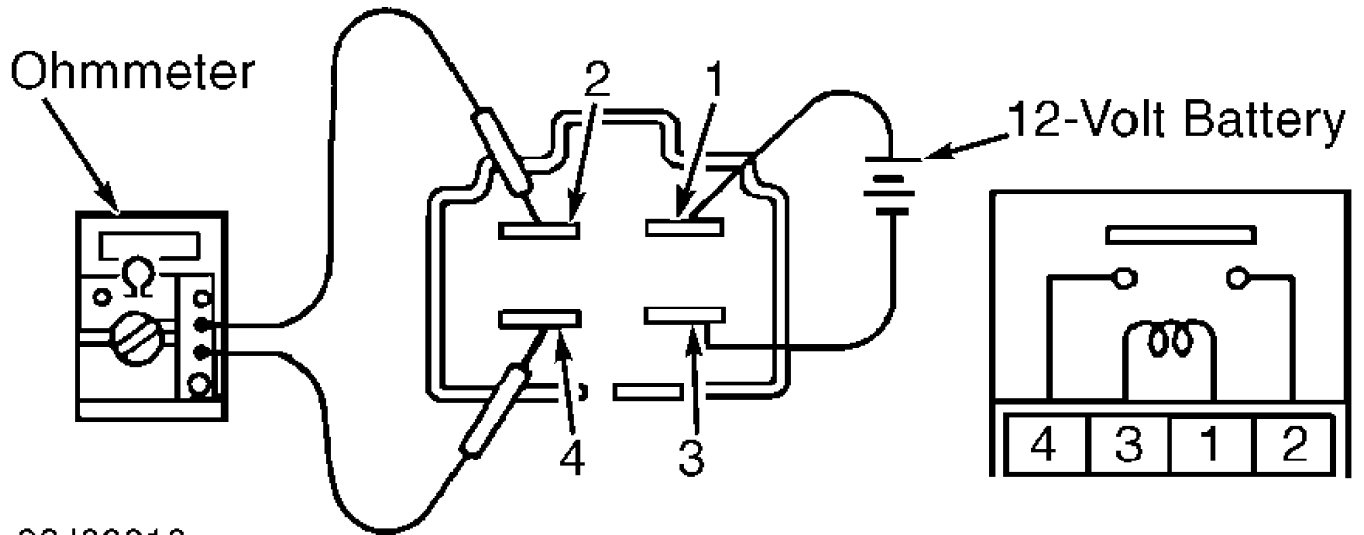


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Fig. 6: Cruise Control Main Switch Connector Terminal ID (SVX)
Courtesy of Subaru of America, Inc.

INHIBITOR RELAY

Relay is located behind right end of instrument panel, next to cruise control unit. Remove relay. Apply battery voltage across relay terminals No. 1 and 2. See Fig. 7. Check continuity between terminals No. 3 and 4. If there is no continuity, replace relay.



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Fig. 7: Identifying Inhibitor Relay Connector Terminals
Courtesy of Subaru of America, Inc.

VACUUM PUMP & VALVE ASSEMBLY

Resistance Test

Vacuum pump and valve assembly is located in engine compartment, on right front strut tower. Disconnect vacuum pump and valve assembly connector. Measure resistance between specified terminals of assembly connector. See VACUUM PUMP & VALVE ASSEMBLY RESISTANCE TEST table. See Fig. 8. If resistance is not as specified, replace vacuum pump and valve assembly.

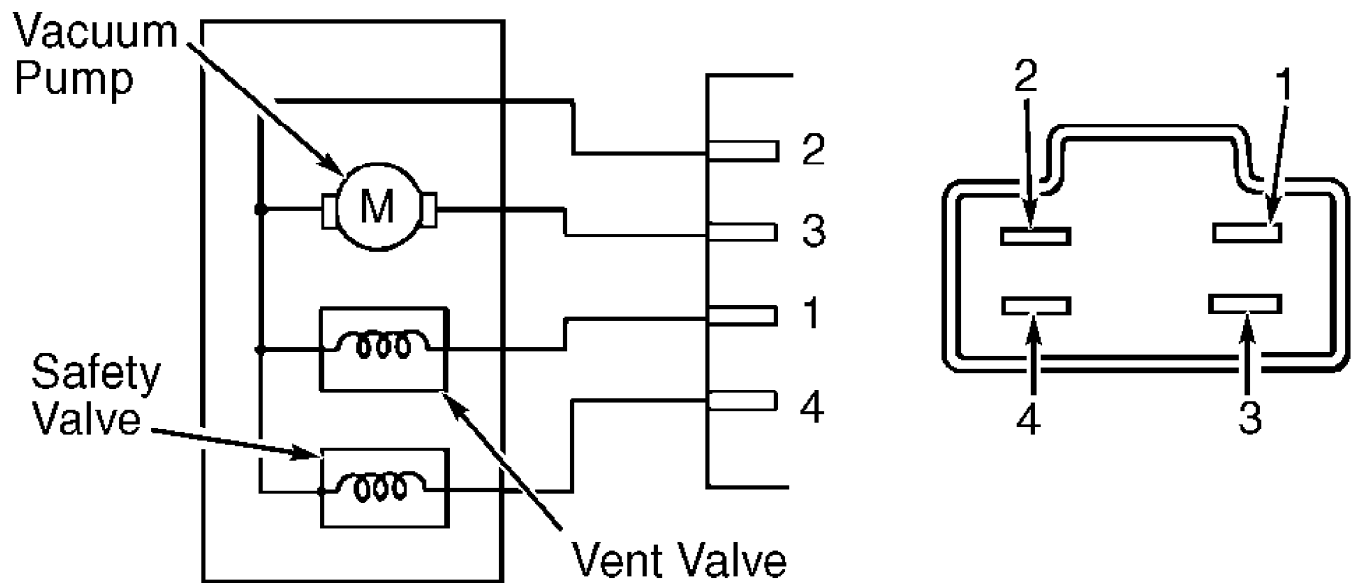
VACUUM PUMP & VALVE ASSEMBLY RESISTANCE TEST

Circuit	Terminal Nos.	Ohms
Vacuum Pump	2 & 3	100-110
Vent Valve	1 & 2	About 53
Safety Valve	2 & 4	About 53

Function Test

1) Turn off engine. Disconnect electrical connector from vacuum pump and valve assembly. Apply battery positive lead to terminal No. 2, and negative lead to terminals No. 1 and 4. See Fig. 8. Ground terminal No. 3. If throttle does not fully open within 3 seconds, replace vacuum pump and valve assembly.

2) If throttle fully opens within 3 seconds, disconnect battery lead from terminal No. 2. If throttle does not fully close within 3 seconds, check actuator. See ACTUATOR under DIAGNOSIS & TESTING. If actuator is okay, replace vacuum pump and valve assembly.



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Fig. 8: Identifying Vacuum Pump & Valve Assembly Connector Terminals
 Courtesy of Subaru of America, Inc.

ACTUATOR & CRUISE CONTROL CABLE REMOVAL & INSTALLATION

NOTE: Actuator and cable are a non serviceable assembly.

Removal & Installation

Remove intake manifold cover. Remove adjusting nuts securing cable to bracket near throttle. Disconnect cable from throttle cam. Disconnect vacuum hose from actuator. Remove actuator mounting bolts. Remove actuator and cable as an assembly. To install, reverse removal procedure. After installing, adjust cable. See CRUISE CONTROL CABLE under ADJUSTMENTS.

CONTROL SWITCH (SUB-SWITCH) REMOVAL & INSTALLATION

Removal & Installation

Remove horn pad. Disconnect horn switch connector. Remove switch screws. Remove switch. To install, reverse removal procedure.

CRUISE CONTROL MAIN SWITCH REMOVAL & INSTALLATION

NOTE: Information on SVX is not available from manufacturer.

Legacy

Pry main switch from instrument panel with a small screwdriver. If necessary, disengage snap lock on right side of switch. Disconnect electrical connector. To install, reverse removal procedure.

CRUISE CONTROL UNIT REMOVAL & INSTALLATION

WARNING: On vehicles with air bag, air bag system wiring harness, identified by Yellow connectors, is routed near cruise control unit. DO NOT use electrical test equipment on air

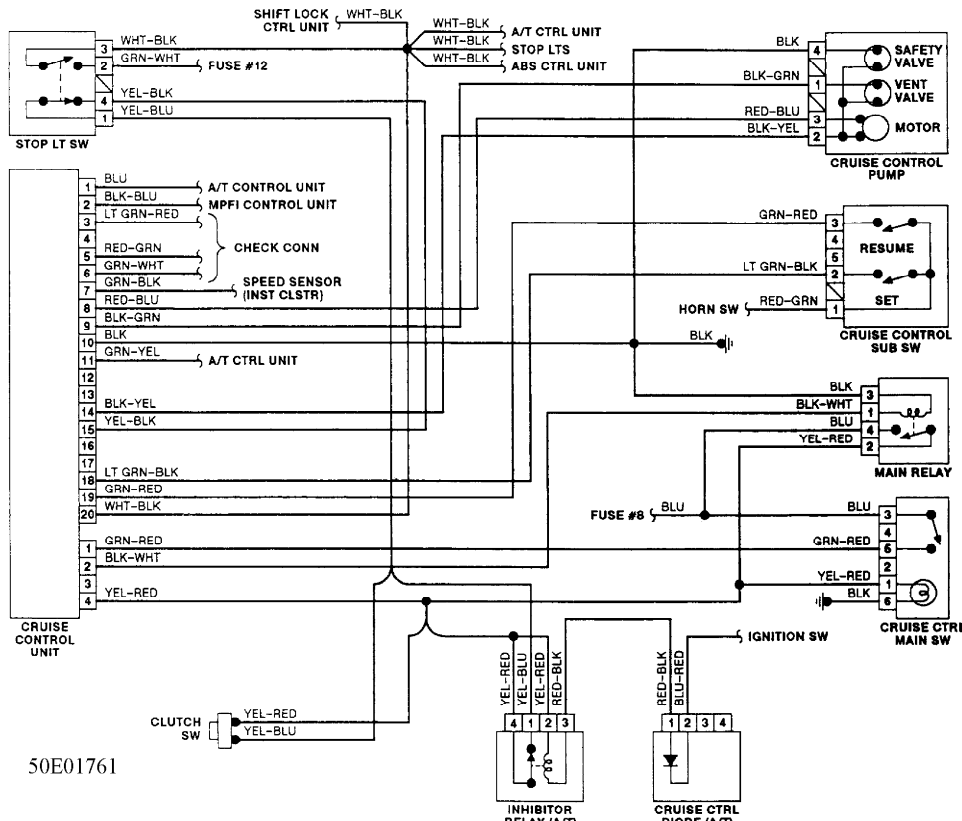
bag system connectors or harness.

Removal & Installation

Turn ignition off. Remove glove box. Remove right and lower sheet metal frames of instrument panel. Remove cruise control unit. To install, reverse removal procedure.

WIRING DIAGRAMS

For 1992 model wiring diagrams, see WIRING DIAGRAMS article.



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Fig. 9: Cruise Control System Wiring Diagram (1990-91 Legacy)