Electronic Speed Control

Shop Service Manual

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PRECISION CONTROLS

DANA
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General Description
3-R and 4-R

The Electronic Speed Control system is designed to maintain a set speed by using a vacuum operated Servo Unit. The Speed Control system consists of five major components: The SERVO, mounted in the engine compartment and is controlled by the electronic regulator. Manifold vacuum provides the force for diaphragm motion. The ROAD SPEED PICK-UP, mounted under the vehicle near the drive shaft or axle shaft to generate an electrical impulse. The ELECTRONIC REGULATOR, is mounted under the dash and contains the electronic circuits; the DISENGAGEMENT SWITCH, located under the dash disengages the system by two methods and both are activated when the brake pedal (automatic or manual transmission) or clutch pedal (manual transmission) is depressed; the CONTROL SWITCH, mounted on the steering column or dash panel and used to operate the system.

7-R, 8-R and 10-R

The Electronic Speed Control system is designed to maintain a set speed by using a vacuum operated servo unit. The Speed Control system consists of five major components: The Servo, mounted in the engine compartment and is controlled by the electronic regulator. Manifold vacuum provides the force for diaphragm motion. The Road Speed pick-up on the 8-R system is mounted under the vehicle near the drive shaft or axle shaft to generate an electrical impulse. The Road Speed pick-up on the 7-R system is mounted to the speedometer cable, and generates an electronic impulse to the electronic regulator. The Engine Speed pick-up on the 10-R system mounts to a spark plug wire and generates a signal to the electronic regulator. The Electronic Regulator is mounted under the dash and contains the electronic circuits. The Disengagement Switch (Dump Valve) is mounted near the servo and disengages all vacuum from the servo when the brake is depressed. The Control Switch is normally mounted on the turn signal lever and is used to operate the system.

NOTE:
THIS BOOK TO BE USED IN CONJUNCTION WITH OWNERS MANUAL

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Vacuum Check

Vacuum

1. Vacuum must come from the intake manifold - a fitting that has a hose nipple not being used.

2. An existing tee in a manifold vacuum line or a vacuum tee can be used.

NOTE: The Speed Control will not work if you choose a hose with "ported" vacuum. Ported vacuum comes from above the carburetor throttle plate and operates the distributor spark advance and the EGR valve. To check, run engine at idle, disconnect hose and put finger over opening. Choose source which has good suction at idle.

See Owner’s Manual for vacuum line installation

WARNING
If no other source is available, engine vacuum can be obtained from the large hose to the vacuum brake booster - BUT - teeing into this hose is a safety-related action. All connections in or to this hose should be glued or have hose clamps. Chrysler vehicles with power brakes usually have a 1/4" vacuum fitting on the booster check valve. Many imports have the check valve in the large hose. If you tee into this line, you MUST do so between the check valve and the manifold connection.

For Low Vacuum Applications

Vacuum Tank

1. Pulling an extra heavy load, climbing a steep hill, or bucking a strong headwind and experiencing a more than normal loss of speed - since the Speed Control is vacuum operated, some vehicles cannot supply enough vacuum for proper operation. It is recommended a vacuum tank, No. 250-6019, be used to correct this occasional problem.

2. In a vehicle powered by a turbocharged engine, there is a need for a vacuum tank. Under normal driving conditions, the intake manifold provides negative (vacuum) pressure. Under wide open throttle (kickdown), the intake manifold changes from negative to positive pressure.

Vacuum Regulator

A vacuum regulator must be used on gasoline and diesel-powered vehicles equipped with a vacuum pump. The vacuum regulator device lowers the constant high vacuum output of the vacuum pump and allows the Servo of the Speed Control to work in a positive manner.
Servo Vacuum Check

To make this check (with servo on the vehicle), the servo harness must be disconnected from the main wiring harness.

1. Disconnect servo at the throttle lever.

   **NOTE:** Attach a spring to, or hang a weight on the ball at the end of the servo cable so it will have no slack. Slack could cause the cable to slip out of the internal pulley’s groove.

2. Put vehicle shift lever in neutral and set parking brake; or with automatic transmission, put lever in PARK. Start engine and run at hot idle.

3. Attach one jumper wire to chassis ground, and other end to Orange wire terminal.

4. Attach another jumper wire to positive (+) terminal of a 12-volt battery, and the other end to White wire terminal.

5. Attach one more jumper wire to positive (+) terminal of a 12-volt battery and other end to Maroon wire terminal.

6. Repeat steps 3, 4 and 5 several times to be sure valve is able to open against vacuum pull when voltage is applied and close off vacuum when voltage is removed.

7. If valve performs as required, turn ignition switch off. Remove test equipment, re-connect servo to throttle. Re-attach vacuum hose and connect servo harness to main harness. If servo does not perform as described, replace servo.

**IMPORTANT:**

The installer should instruct the owner to refer to his Owner’s Manual if a two-way radio is later installed in the vehicle.

If there is already a two-way radio in the vehicle, certain steps should be taken to prevent it from interfering with the Speedostat Speed Control:

1. Locate the regulator as far from the transceiver as practical (at least 3 inches).
2. Route the Speedostat wiring harnesses as far from the radio’s power and ground wires and coaxial cable as practical.
3. Wire the radio directly to the battery.
4. Adjust the standing wave ratio of the antenna as low as possible.
Disengagement Switch and Vacuum 3-R & 4-R

Valve Check

1. Valve Check
   (a) Take vacuum hose from switch, plug hose end (must not leak), drive vehicle.
   (b) Check all hoses for leaks.

2. Switch Won't Disengage
   (a) Check for obstructions (carpet, floor mats, etc.).
   (b) Check position of switch on clutch or brake lever.
   (c) Check chain too tight.

3. Intermittent Operation
   (a) Check hose and switch for leaks (vacuum check).

Dump Valve Check
7-R, 8-R & 10-R

Electrical Check - Check continually between term. #8 (pink) and #1 (lt. green). If circuit is open, check ground of light green wire at dump valve and connection of pink wire. If connections ok and circuit open, replace dump valve.

Leak Check - Disconnect pink wire from main wiring harness and apply 12V to dump valve wire. Unplug large hose from servo, suck on hose and seal end with tongue. If vacuum cannot be held, replace dump valve.

Servo/Throttle Setting

Servo Cable Adjustment

1. Servo's full travel is 1 11/16". Travel of lever or pulley segment or carburetor at point of connection must be more than 1 11/16" or slack must be added to chain link (carburetor travel must be more than servo travel) of lever or pulley reaches its stop before servo does. Servo is powerful enough to break its cable or strip off a bead. To set proper adjustment, measure straight line travel of lever or pulley segment at point of attachment.

   NOTE: If your vehicle has a carburetor which has a choke plate (shown in figure above), travel must be measured between "hot idle" position and "wide open throttle" position. Linkage adjusted to "cold idle" position will not let throttle close when engine warms up.

   To set a cold carburetor for "hot idle", open throttle with one hand, hold choke plate vertical with other hand. Release throttle, then release choke plate. EACH TIME YOU MEASURE TRAVEL YOU MUST RESET "HOT IDLE" BECAUSE OPENING THE THROTTLE LETS CHOKE PLATE RETURN TO COLD IDLE.
Terminal Releasing Instructions

There are three types of terminals and each has a locking tab to hold it in its connector body. To remove the terminal, depress the locking tab, then pull on the wire. Use a narrow thin blade or a terminal releasing tool, and insert it into the open end of the connector in such a way that the locking tab is pressed against the terminal.

Before putting any terminal back into a connector body, pry the locking tab out of the angle shown. Do not over-bend. Copper alloys will harden and break if flexed too much or too often.

Terminal Straightening Instructions

Looking into the end of the connector housing, check that all terminal locking tabs are in the up position. If not, use a small wire (paper clip that is straightened or a straight pin). Insert from front and pull wire under terminal locking tab and pull in upward fashion until the tabs are even. This will make for a better connection when connector body is put in regulator.

Resistance Measurement

These tests should be made with an ohmmeter having an accuracy of least ±2%.

Test Conditions:

1. Disconnect 14-pin connector of main wiring harness from Speed Control regulator. See removal instructions on page opposite. Regulator is located under instrument panel.
2. Remove fuse from fuse holder in red power wire of Speed Control main wiring harness.
3. Turn vehicle ignition switch to OFF position.
4. Connect ohmmeter leads to the connector terminals as shown below.

<table>
<thead>
<tr>
<th>Circuit Tested</th>
<th>OHM Meter From</th>
<th>Leads To</th>
<th>Correct Resistance</th>
<th>If Circuit Checks Open or Shorted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position feedback rheostat in servo</td>
<td>Terminal 2 (black)</td>
<td>Terminal 11 (tan)</td>
<td>180 to 600 ohms</td>
<td>Servo needs to be replaced. (It has a bad rheostat, broken wire or broken terminal on rheostat lead.)</td>
</tr>
<tr>
<td>Road Speed pick-up coil</td>
<td>Terminal 2 (black)</td>
<td>Terminal 3 (blue)</td>
<td>41 to 51 ohms</td>
<td>A new road speed pick-up coil assembly is needed</td>
</tr>
<tr>
<td>Servo Charge valve coil</td>
<td>Terminal 12 (orange)</td>
<td>Terminal 4 (maroon)</td>
<td>38 to 48 ohms</td>
<td>A new servo is needed</td>
</tr>
<tr>
<td>Servo Vent valve coil</td>
<td>Terminal 12 (orange)</td>
<td>Terminal 6 (white)</td>
<td>38 to 48 ohms</td>
<td>A new servo is needed.</td>
</tr>
<tr>
<td>Spark Sensor</td>
<td>Terminal 2</td>
<td>Terminal 9</td>
<td>Continuity check</td>
<td>If open check light blue wire and gray wire for breaks or broken sensor</td>
</tr>
<tr>
<td>Dump Valve</td>
<td>Ground</td>
<td>Terminal 8</td>
<td>Continuity check</td>
<td>Check pink wire to dump valve and green ground at dump valve or open circuit through valve</td>
</tr>
</tbody>
</table>

NOTE: If a grounded wire or bare wire is found in any of the checks, tape up wire with electrician's vinyl plastic tape or an equivalent substitute.

If terminal wire is broken, repair wire and solder it.
Voltage and Resistance Check

Correct Power Source

12-VOLT CONSTANT SOURCE

1. Power for the Speed Control must come from a "switched" source. "Switched" means one controlled by the ignition switch. Touch one test light lead to ground (find electrical ground by turning on the ignition switch and touching one lead to a fused terminal at fuse panel; touch other lead to unpainted metal part of vehicle. (The metal you touch to make test light come on is ground). Touch other lead to terminal of a wire coming out of accessory section on fuse panel. Turn ignition ON, Test Light should come on. If it does not, try other wires until you find one which lets you turn Test Light ON and OFF with ignition switch.

NOTE: Certain wires from the ignition switch should not be used, such as wires to turn signals, hazard flashers or windshield wipers.

Wire Color Check

Before making continuity or voltage tests, the 14 pin connector at the regulator should be checked to be sure the right color wire goes to each terminal.

When this check is completed, check all other connections to see that the color match-up of the wires is as shown.

<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Wire Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Dark Green</td>
<td>Speed Set</td>
</tr>
<tr>
<td>13</td>
<td>Violet</td>
<td>Disengagement Switch</td>
</tr>
<tr>
<td>12</td>
<td>Orange</td>
<td>Valve Common (Path to Ground through Regulator Circuit)</td>
</tr>
<tr>
<td>11</td>
<td>Tan</td>
<td>Position Feedback</td>
</tr>
<tr>
<td>10</td>
<td>Yellow</td>
<td>Resume</td>
</tr>
<tr>
<td>9 3R/4R</td>
<td>No Terminal</td>
<td>Spark Sensor</td>
</tr>
<tr>
<td>9 7R/8R/10R</td>
<td>Light Blue</td>
<td></td>
</tr>
<tr>
<td>8 3R/4R</td>
<td>No Terminal</td>
<td></td>
</tr>
<tr>
<td>8 7R/8R/10R</td>
<td>Pink</td>
<td>Dump Valve</td>
</tr>
<tr>
<td>7</td>
<td>Brown</td>
<td>Ignition Power</td>
</tr>
<tr>
<td>6</td>
<td>White</td>
<td>Vent Valve</td>
</tr>
<tr>
<td>5</td>
<td>Brown</td>
<td>Ignition Power</td>
</tr>
<tr>
<td>4</td>
<td>Maroon</td>
<td>Charge Valve</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>Speed Signal</td>
</tr>
<tr>
<td>2</td>
<td>Black</td>
<td>Ground</td>
</tr>
<tr>
<td>1</td>
<td>Light Green</td>
<td>Ground</td>
</tr>
</tbody>
</table>

To remove harness from regulator, insert small screwdriver or rod through "TERMINAL RELEASE" hole and press while pulling on wiring harness connector.

*No TERMINAL RELEASE in 7R/8R/10R."
Voltage Measurement

The following test may be made with any appropriate voltage measuring device (12 v. test lamp, voltmeter, volt-ohmmeter). Do not make tests at open end of connector; terminals could be bent and would not make contact with regulator.

1. Disconnect 14-pin connector of main wiring harness from Speed Control regulator. (See wire color check for connector removal).

2. Check wiring harness fuse for correct size (5 amp. max.).

3. Check vehicle ignition switch and engagement switch.

4. Minus (-) lead of volt tester to vehicle chassis ground and plus (+) lead to terminal of each wire.

3-R, 7-R, 8-R and 10-R System

<table>
<thead>
<tr>
<th>Wire Color</th>
<th>Terminal No.</th>
<th>First Test Engagement Switch OFF Vehicle Ignition Switch ON</th>
<th>Second Test Engagement Switch ON Vehicle Ignition Switch ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Green</td>
<td>1</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Black</td>
<td>2</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Blue</td>
<td>3</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Maroon</td>
<td>4</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Brown 3R (Red 7R/8R/10R)</td>
<td>5</td>
<td>0 volts</td>
<td>12 volts</td>
</tr>
<tr>
<td>White</td>
<td>6</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Brown</td>
<td>7</td>
<td>0 volts</td>
<td>12 volts</td>
</tr>
<tr>
<td>Brown 7R, 8R &amp; 10R</td>
<td>7</td>
<td>12 volts</td>
<td>12 volts</td>
</tr>
<tr>
<td>No Terminal</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pink</td>
<td>9</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>No Terminal 3R</td>
<td>10</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Light Blue</td>
<td>11</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Yellow</td>
<td>12</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Tan</td>
<td>13</td>
<td>0 volts</td>
<td>12 volts (0 volts when &quot;SET/COAST&quot; button is depressed).</td>
</tr>
<tr>
<td>Orange</td>
<td>14</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Violet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dark Green</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4-R System

<table>
<thead>
<tr>
<th>Wire Color</th>
<th>Terminal No.</th>
<th>First Test Engagement Switch OFF Vehicle Ignition Switch ON</th>
<th>Second Test Engagement Switch ON Vehicle Ignition Switch ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Green</td>
<td>1</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Black</td>
<td>2</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Blue</td>
<td>3</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Maroon</td>
<td>4</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Brown</td>
<td>5</td>
<td>0 volts</td>
<td>12 volts</td>
</tr>
<tr>
<td>White</td>
<td>6</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Brown</td>
<td>7</td>
<td>0 volts</td>
<td>12 volts</td>
</tr>
<tr>
<td>Yellow</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tan</td>
<td>9</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Orange</td>
<td>10</td>
<td>0 volts (12 volts when &quot;RESUME/ACCEL&quot; Switch is operated).</td>
<td></td>
</tr>
<tr>
<td>Violet</td>
<td>11</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Dark Green</td>
<td>12</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>0 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>0 volts (12 volts when &quot;SET/COAST&quot; button is depressed).</td>
<td></td>
</tr>
</tbody>
</table>
## Continuity Check

These tests may be made with any appropriate continuity tester (battery and lamp, volt-ohmmeter, etc.)

### Test Conditions

1. Main harness connector should be unplugged from regulator.
2. Remove fuse from fuse holder in main harness.
3. Turn vehicle ignition switch to OFF.
4. Control switch slide button in OFF position.
5. Minus (-) lead of continuity tester attached to vehicle engine or chassis ground; plus (+) lead in firm contact with terminals of the regulator connector in the following sequence:

<table>
<thead>
<tr>
<th>Terminal Terminal</th>
<th>Results</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal No. 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Light Green)</td>
<td>Circuit closed</td>
<td>Ear eyelet terminal on servo’s green wire must be grounded.</td>
</tr>
<tr>
<td></td>
<td>Circuit open</td>
<td>If attached to servo stud, servo bracket must be mounted on</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a ground metal surface. If circuit is still open, check</td>
</tr>
<tr>
<td></td>
<td></td>
<td>continuity of light green wire from servo connector to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14-pin connector at regulator. Look for broken wire, loose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>terminal or terminal that pushes out of connector when</td>
</tr>
<tr>
<td></td>
<td></td>
<td>plugged in.</td>
</tr>
<tr>
<td>Terminal No. 2</td>
<td>Circuit open</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>(Black)</td>
<td>Circuit closed</td>
<td>Check black wire, tan wire, gray wire and blue wire for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>exposed conductor touching grounded portion of vehicle.</td>
</tr>
<tr>
<td>Terminal No. 3</td>
<td>Circuit open</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>(Blue) 3-R &amp; 4-R</td>
<td>Circuit closed</td>
<td>Make same checks as on circuit closed. Terminal No. 2</td>
</tr>
<tr>
<td>(Grey) 7-R, 8-R &amp;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal No. 4</td>
<td>Circuit open</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>(Maroon)</td>
<td>Circuit closed</td>
<td>Insure there is no exposed conductor on the maroon, white</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or orange wires touching grounded portion of vehicle. Perform</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steps 2 and 3 of Service Check of Electronic Speed Control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Servo to see if servo is grounded internally.</td>
</tr>
<tr>
<td>Terminal No. 5</td>
<td>Circuit open</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>(Brown 9R)</td>
<td>Circuit closed</td>
<td>Insure that brown and green wires of Control Switch Wiring</td>
</tr>
<tr>
<td>(Red 7R, 8R, 1OR)</td>
<td></td>
<td>Harness, and dark green wire and brown wire of Main</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wiring Harness are not shorted to ground.</td>
</tr>
<tr>
<td>Terminal No. 6</td>
<td>Circuit open</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>(White)</td>
<td>Circuit closed</td>
<td>Same check procedures as listed for Terminal No. 4, circuit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>closed.</td>
</tr>
<tr>
<td>Terminal No. 7</td>
<td>Circuit open</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>(Brown)</td>
<td>Circuit closed</td>
<td>Same check procedure as listed for Terminal 5, circuit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>closed.</td>
</tr>
<tr>
<td>Terminal No. 8</td>
<td>No Terminal</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>3-R &amp; 4-R</td>
<td>Circuit closed</td>
<td>Insure that pink wire is not broken, check green ground</td>
</tr>
<tr>
<td>Terminal No. 8</td>
<td>Circuit open</td>
<td>wire at dump valve.</td>
</tr>
<tr>
<td>(Pink) 7-R, 8-R &amp;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal No. 9</td>
<td>No Terminal</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>3-R &amp; 4-R</td>
<td>Circuit open</td>
<td>Insure that blue wire of spark sensor is not shorted to</td>
</tr>
<tr>
<td>Terminal No. 9</td>
<td>Circuit closed</td>
<td>ground.</td>
</tr>
<tr>
<td>(Lt. Blue)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-R, 8-R &amp; 10-R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal No. 10</td>
<td>Circuit open</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>(Yellow)</td>
<td>Circuit closed</td>
<td>Insure that yellow wire of Main Wiring Harness and yellow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>wire of Control Switch Harness have not been shorted to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ground.</td>
</tr>
<tr>
<td>Terminal No. 11</td>
<td>Circuit open</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>(Tan)</td>
<td>Circuit closed</td>
<td>Check black wire, tan wire, gray wire, and blue wire for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>exposed conductor touching grounded portion of vehicle.</td>
</tr>
<tr>
<td>Terminal No. 12</td>
<td>Circuit open</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>(Orange)</td>
<td>Circuit closed</td>
<td>Same check procedures as listed for Terminal No. 4, circuit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>closed.</td>
</tr>
<tr>
<td>Terminal No. 13</td>
<td>Circuit closed</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>(Violet)</td>
<td>(open when brake</td>
<td>Start with violet wire at regulator connector and check for</td>
</tr>
<tr>
<td></td>
<td>pedal is depressed)</td>
<td>breaks and poor connections as you trace the following</td>
</tr>
<tr>
<td></td>
<td>Circuit open</td>
<td>circuit: First, to the connection with the disengagement</td>
</tr>
<tr>
<td>3-R &amp; 4-R</td>
<td></td>
<td>switch, then check to see that the switch leads are firmly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>attached to the switch body and the switch is properly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>adjusted follow brown lead to the connection with the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>deceleration switch, insure the switch is properly mounted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[10° above horizontal]; continue on to the connection with</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the green wire of the Main Harness; then check the green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>wire on both sides of the servo connection; see that the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>green servo wire and eyelet terminal is firmly attached to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>vehicle ground; and finally, inspect the connection of the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>light green wire at Terminal No. 1 of the 14-pin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>regulator connector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Insure that violet wire is properly attached to the cold</td>
</tr>
<tr>
<td></td>
<td></td>
<td>side of the brake switch, or repair open in brake</td>
</tr>
<tr>
<td></td>
<td></td>
<td>lamp circuit to ground.</td>
</tr>
<tr>
<td>Terminal No. 14</td>
<td>Circuit open</td>
<td>None, system ok.</td>
</tr>
<tr>
<td>(Dark Green)</td>
<td>Circuit closed</td>
<td>Same check procedure as listed for Terminal No. 5, circuit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>closed.</td>
</tr>
</tbody>
</table>
Control Switch Resistance Measurement 3R - 7R - 8R - 10R

1. These tests should be made with an ohmmeter having an accuracy of at least ±2%.
2. Zero ohmmeter before making measurement.
3. Plus (+) lead of ohmmeter to red wire. Minus (-) lead of ohmmeter to brown wire. Slide switch to “ON” position. Minus (-) meter should show zero ohms. Should not show more than 1/2 ohm of resistance. If higher than 1/2 ohm, replace control switch.
4. Minus (-) lead of ohmmeter to green wire. Slide switch to “ON” position. Minus (-) meter should show zero ohms, should not shown more than 1/2 ohm of resistance. If higher than 1/2 ohm, replace control switch.
5. Push SET/COAST button in and hold. Minus (-) circuit should open completely. If it does not replace control switch.
6. Minus (-) lead of ohmmeter to yellow wire. Slide switch “ON” position. Minus (-) slide switch held to “RESUME/ACCEL” position. Minus (-) meter should show zero ohms. Should not show more than 1/2 ohm of resistance. If higher than 1/2 ohm, replace control switch. Release slide switch and circuit should open.

Control Switch Check • 4-R • Trouble Shooting Guide

Use a 12 Volt Test Light and Jumper Wire To Perform These Checks.
Disconnect switch at flat, 4-wire harness connector. Attach jumper wire from 12 volt power to red wire terminal of Control Switch Connector.

<table>
<thead>
<tr>
<th>TEST CONDITIONS</th>
<th>WIRE COLOR</th>
<th>SWITCH O.K.</th>
<th>REPLACE SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slide switch to OFF, ground one test light lead, touch other test lead in turn, to terminal of:</td>
<td>Brown Wire</td>
<td>Light OFF</td>
<td>Light ON</td>
</tr>
<tr>
<td></td>
<td>Green Wire</td>
<td>Light OFF</td>
<td>Light ON</td>
</tr>
<tr>
<td></td>
<td>Yellow Wire</td>
<td>Light OFF</td>
<td>Light ON</td>
</tr>
<tr>
<td>Slide switch to ON, ground one test light lead, touch other test lead in turn, to terminal of:</td>
<td>Brown Wire</td>
<td>Light ON</td>
<td>Light OFF</td>
</tr>
<tr>
<td></td>
<td>Green Wire</td>
<td>Light ON</td>
<td>Light OFF</td>
</tr>
<tr>
<td></td>
<td>Yellow Wire</td>
<td>Light ON</td>
<td>Light OFF</td>
</tr>
<tr>
<td>Slide switch ON, press and hold “SET/COAST” button. Ground one test light lead, touch other test lead, in turn, to terminal of:</td>
<td>Brown Wire</td>
<td>Light ON</td>
<td>Light OFF</td>
</tr>
<tr>
<td></td>
<td>Green Wire</td>
<td>Light ON</td>
<td>Light OFF</td>
</tr>
<tr>
<td></td>
<td>Yellow Wire</td>
<td>Light ON</td>
<td>Light OFF</td>
</tr>
<tr>
<td>Slide switch ON, press and hold “RESUME/ACCEL” button. Ground one test light lead, touch other test lead, in turn, to terminal of:</td>
<td>Brown Wire</td>
<td>Light ON</td>
<td>Light OFF</td>
</tr>
<tr>
<td></td>
<td>Green Wire</td>
<td>Light ON</td>
<td>Light OFF</td>
</tr>
<tr>
<td></td>
<td>Yellow Wire</td>
<td>Light ON</td>
<td>Light OFF</td>
</tr>
</tbody>
</table>

SWITCH OPERATION DATA

<table>
<thead>
<tr>
<th>SLIDE SWITCH</th>
<th>SLIDE SWITCH ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>RESUME/ACCEL</td>
</tr>
<tr>
<td>Red/Brown Open</td>
<td>Closed</td>
</tr>
<tr>
<td>Red/Green Open</td>
<td>Closed</td>
</tr>
<tr>
<td>Red/Yellow Open</td>
<td>Closed</td>
</tr>
</tbody>
</table>

NOTE: See Owners Manual for Trouble Shooting Guide
Pick-Up Coil Output Check

1. Use a voltmeter with 2.5 volt scale, A.C. voltage.
2. Remove Regulator from 14-pin connector of wiring harness.
3. Connect voltmeter to terminals 2 and 3 of wiring harness.
4. Start vehicle and drive to 30 mph.
   This becomes a two-person operation.
   The Regulator can use a minimum of .05 volts at 30 mph. You will see some increase in voltage as speed increases. If voltage output is present, speed sensor or coil is okay. If voltage is not present, check sensor or coil for continuity. If no continuity, replace sensor or coil.

Poor Electrical Connection Check

(Wiggle & Flex Method)

The 1-R Tester can also perform another function which will verify that the terminals of 14-pin connector of wiring harness will have good continuity when plugged onto Regulator.

This becomes a two-person operation.

With the 1-R Tester plugged into the 14-pin connector of the Wiring Harness.

1) Turn ignition switch to “ON”.
2) Move Control Slide Switch to “ON” position.
3) Have second person hold slide switch to “RESUME/ACCEL” position. All lights will be on.
4) While holding (Step 3), hold wiring harness connector in one hand and 1-R Tester in the other hand, wiggle and flex to see that all lights stay on.

If lights come and go, terminal or terminals in connector body are not making good contact. Terminals can be removed from connector and the spring members of the terminal bent upward. Insert terminals back into connector body (you can obtain a new wiring harness, but a quick repair may put vehicle back in service).
Tester Procedure

THIS PROCEDURE FOR TESTING SYSTEM WITH YELLOW BOX REGULATOR

SPEED CONTROL SYSTEM TESTER EACH LIGHT CHECKS THE FOLLOWING

LIGHT 1
Power Source, Fuse and Ground; ON and OFF; and "Set/Coast" Position of Control Switch, Control Switch, and Associated Wiring Terminals and Connectors.

LIGHT 2
Road Speed Pick-Up Associated Wiring Harness Terminals and Connectors.

LIGHT 3
Disengagement Switch Adjustment Deceleration Switch and Associated Wiring Harness Terminals and Connectors.

LIGHT 4
Throttle Position Feedback and Associated Wiring Harness Terminals and Connectors.

LIGHT 5
Serve Valve, "Resume/"Contact in the Control Switch and Associated Wiring Harness Terminals and Connectors.

LIGHT 6
Serve Valve, "Resume/"Contact in the Control Switch and Associated Wiring Harness Terminals and Connectors.

3-R System

Trouble Shooting for Incorrect Response

ANY LIGHT ON DURING TEST NO. 1
incorrect wire connections Direct Current to Constant Power

These Are Checks To Make For Incorrect Lights In Tests 2 Thru 5

LIGHT 3 - OFF
Check Served Connections Correctly; Blue and Gray Wire Connections 2, 3, 4, and 6 Terminals (Black, Blue, Brown, and Yellow Wire) At Regulator Connector.

LIGHT 2 - OFF
Check Deceleration Switch Adjustment; Deceleration Switch Angle (See Owner's Manual)); All Brown, Violet, and Light Green Wire Connections.

LIGHT 4 - OFF
Check Deceleration Switch Adjustment; Deceleration Switch Angle (See Owner's Manual)); All Brown, Violet, and Light Green Wire Connections.

LIGHT 5 - OFF
Bad Connection at Terminal 6 (White Wire) or Terminal 12 (Orange Wire); Bad Servo.

LIGHT 6 - OFF
Bad Connection at Terminal 6 (Yellow Wire) or Terminal 12 (Orange Wire); Bad Servo.

ALL LIGHTS - OFF
After Pushing "Set Speed" or "Resume" (Test 3 or 5); Blow Fuse, Red or White Wire Shorted; Bad Servo.

Refer To Owner's Manual Or Shop Service Manual For Additional Information
**Tester Procedure**

**4-R System**

**Trouble Shooting for Incorrect Response**

**4-R**

**Test No. and Condition** | **Correct Response**
--- | ---
1. Correct Power Source | ALL LIGHTS - OFF
   Ignition Switch "OFF" 
   Control Switch "ON"

2. System's Electrical 
   Continuity | LIGHTS
   Ignition Switch "ON" 
   Control Switch "ON"
   ON 2.3A 1.5A

3. Servo Valve 
   Continuity | LIGHTS
   Ignition Switch "ON" 
   Control Switch "ON"
   Push and Hold Sat/Coast 
   Button
   ON 1.23A 2A

4. Disengagement Switch 
   Continuity | LIGHTS
   Ignition Switch "ON" 
   Control Switch "ON"
   Push and Hold Brake Pedal
   ON 2.4 1.3A

5. Resume/Accel Position 
   of Control Switch | LIGHTS
   Ignition Switch "ON" 
   Control Switch "ON"
   Push and Hold 
   Resume/Accel Button 
   IMPORTANT
   To Activate Servo Release "Resume/Accel" Button and 
   With Vehicle in Neutral or Park,
   Start Engine Push Resume/Accel Button and 
   Release Immediately When 
   Servo Starts to Pull on Throttle 
   Linkage.
   ON 2.3,4.5A 1
   Light 4 Will Dim. If Throttle 
   Does Not Open, check 
   Servo Cable Connections at 
   Servo and Carburator. 
   Check Disengagement 
   Switch, Vacuum, and 
   Vacuum Hoses and Wir- 
   ing Connections.

**ANY LIGHT ON DURING TEST NO. 1**

Red Wire Connected Shorly to Connect Power 

**These Are Checks To Make For Incorrect Light**

**LIGHT 1** - OFF 
Check Red, Brown, and Green Wires at Control Switch Connector, and 14 (Dark Green Wire) at Regulator Connector for good Connections.

**LIGHT 2** - OFF 
Check Road Speed Pick-Up Coil Continuity: Blue and Gray Wire Connections: 2,3,5 & 7 Terminals (Black, Blue, Brown and White Wires) at Regulator Connector.

**LIGHT 3** - OFF 
Check Disengagement Switch Adjustment: All Brown, Violet, and Light Green Wire Connections.

**LIGHT 4** - OFF 
Check Terminals 3 and 11 (Black and Tan Wires) at Regulator Connector; Continuity of Throttle Position Feedback Rheostat at Servo (See Circuit Diagram).

**LIGHT 5** - OFF 
Check Connection at Terminal 6 (White Wire) or Terminal 12 (Orange Wire) Bad Servo.

**LIGHT 6** - OFF 
Check Connection at Terminal 4 (Maroon Wire) at Terminal 12 (Orange Wire); Bad Servo.

**ALL LIGHTS - OFF**

After Pushing "Set/Coast" or "Resume/Accel" (Test 3 or 5); Blown Fuse; Red or White Wires Shorted. Bad Servo.

Refer to Owner's Manual or Shop Service Manual for Additional Information.
Grey Regulator

7-R System

WIRING SCHEMATIC
7-R System

EACH LIGHT CHECKS THE FOLLOWING

7-R
NOTE: There will be a 200-3122 number on back to identify revision made to Test 7-R, 8-R & 10-R Systems as well as previous systems.

7-R
Trouble Shooting For Incorrect Response

ANY LIGHT ON DURING TEST NO. 1
Brown Wire (No. 7 Reg. Terminal) connected directly to Constant Power Source; Bad Control Switch

THES ARE CHECKS TO MAKE FOR INCORRECT LIGHTS IN TESTS 2 THRU 6

LIGHT 1 - OFF
Check Fuse in Red Wire, Check Red, Brown and Green Wire at Control Switch Connector, and 14 Dark Green Wire at Regulator Connector for Good Conditions.

LIGHT 2 - OFF
Check Speed Sensor Continuity, Speed Sensor Termination to Gray & Dk. Blue Wire, 2, 3, 5 & 7 Terminals (Black, Dk. Blue, Red and Brown Wires) at Regulator Connector.

LIGHT 3 - OFF
Check Brake Light Switch Adjustment, All Brown, Red, Violet and Lt. Green Wire Connections.

LIGHT 4 - OFF
Check 3 Terminals and 11 (Black and Tan Wires) at Regulator Connector, Continuity of Throttle Position Feedback Rheostat Servo.

LIGHT 5 - OFF
Bad Connection at Terminal 6 (White Wire) or Terminal 12 (Orange Wire); Bad Servo.

LIGHT 6 - OFF
Bad Connection at Terminal 4 (Maroon Wire) or Terminal 12 (Orange Wire); Bad Servo.

ALL LIGHTS - OFF
After pushing "SET/COAST" or "RESUME/ACCEL" (Test 4 or 6), Brown Fuse, Maroon, Red, Brown or White Wires Shorted; Bad Servo.
Purple Regulator

WIRING SCHEMATIC
8-R System

EACH LIGHT CHECKS THE FOLLOWING

LIGHT 1
Power Source, Fuse and Ground, "ON/COAST" and "SET/COAST" Position of Control Switch.

LIGHT 2
Speed Sensor, Associated Wiring Harness Terminals and Connectors.

LIGHT 3
Brake Light Switch Adjustment and Associated Wiring Harness Terminals and Connectors.

LIGHT 4
Throttle Position Feedback and Associated Wiring Harness Terminals and Connectors.

LIGHT 5

LIGHT 6
Servo Change Valve. "Resume" Contacts of the Control Switch and Associated Wiring Harness Terminals and Connectors.

LIGHT 7
System's Electrical Continuity: Ignition Switch "ON" Control Switch "ON"

LIGHT 8
Servo Valve Continuity: Ignition Switch "ON" Control Switch "ON" Push and Hold SET/COAST Button IMPORTANT

LIGHT 9
If Engine is Running, Servo will pull Throttle to Full Open.

LIGHT 10
Disengagement (Brake Light Switch) Check Ignition Switch "ON" Control Switch "ON" Push and Hold Brake Pedal

LIGHT 11
"Resume" Position of Control Switch Ignition Switch "ON" Control Switch "ON" Slide and Hold OFF/ON Switch to RESUME/ACCEL IMPORTANT

LIGHT 12
If Engine is Running, Servo will pull Throttle to Full Open.

8-R
Test No. and Condition
1. Correct Power Source - First: Ignition Switch "OFF" Control Switch "OFF"

2. Correct Power Source - Second: Ignition Switch "OFF" Control Switch "ON"

3. System's Electrical Continuity: Ignition Switch "ON" Control Switch "ON"

4. Servo Valve Continuity: Ignition Switch "ON" Control Switch "ON" Push and Hold SET/COAST Button

5. Disengagement (Brake Light Switch) Check Ignition Switch "ON" Control Switch "ON" Push and Hold Brake Pedal

8-R
Correct Response

8-R
Trouble Shooting for Incorrect Response ANY LIGHT ON DURING TEST NO. 1
Brown Wire (No 7 Reg. Terminal) Connected Directly to Constant Power Source; Bad Control Switch.

.these are checks to make for incorrect lights in tests 2 thru 6

8-R
Light 1 - OFF
Check Fuse in Red Wire, Check Red, Brown and Green Wires at Control Switch Connector; and 14 (Dark Green Wire at Regulator Connector for Good Connections.)

LIGHT 2 - OFF
Check Speed Sensor Continuity; Speed Sensor Termination to Grey and Dk. Blue Wire; 2, 3, 5 & 7 Terminals (Black, Dk. Blue, Red and Brown Wires) at Regulator Connector.

LIGHT 3 - OFF
Check Brake Light Switch Adjustment; All Brown, Red, Violet and Light Green Wire Connections.

LIGHT 4 - OFF
Check Brake Light Switch Adjustment; All Brown, Red, Violet and Light Green Wire Connections.

LIGHT 5 - OFF
Bad Connection at Terminal 8 (White Wire) or Terminal 12 (Orange Wire); Bad Servo.

LIGHT 6 - OFF
Bad Connection at Terminal 4 (Maroon Wire) or Terminal 12 (Orange Wire); Bad Servo.

ALL LIGHTS - OFF
After pushing "SET/COAST" or "RESUME/ACCEL" (Test 4 or 5); Brown Fuse; Maroon, Red, Brown or White Wires Shorted; Bad Servo.
Orange Regulator

10-R System

WIRING SCHEMATIC
10-R System

EACH LIGHT CHECKS THE FOLLOWING

LIGHT 1
Power Source, Fuse and Ground, "ON/OFF" and "SET/COAST" Position of Control Switch

LIGHT 2
Off - Not used for 10-R

LIGHT 3
Brake Light Switch Adjustment and Associated Wiring Harness Terminals and Connectors.

LIGHT 4
Throttle Position Feedback and Associated Wiring Harness Terminals and Connectors.

10-R Troubleshooting For Incorrect Response
ANY LIGHT ON DURING TEST NO. 1
Brown Wire (No. 7 Reg. Terminals) Connected directly to Constant Power Source; Bad Control Switch

 THESE ARE CHECKS TO MAKE FOR INCORRECT LIGHTS IN TESTS 2 THRU 5

LIGHT 1 - OFF
Check Fuse in Red Wire, Check Red, Brown and Green Wires at Control Switch Connector, and 14 (Dark Green Wire) at Regulator Connector for Good Connections.

LIGHT 2 - OFF
Check Brake Light Switch Adjustment; All Brown, Red, Violet and Light Green Wire Connections.

LIGHT 4 - OFF
Check Terminals 2 and 11 (Black and Tan Wires) at Regulator Connector; Continuity of Throttle Position Feedback Reostat of Servo.

LIGHT 5 - OFF
Bad Connection at Terminal 6 (White Wire) or Terminal 12 (Orange Wire), Bad Servo.

LIGHT 6 - OFF
Bad Connection at Terminal 4 (Maroon Wire) or Terminal 12 (Orange Wire), Bad Servo.

ALL LIGHTS - OFF
After pushing "SET/COAST" or "RESUME/ACCEL" (Test 3 or 5); Blown Fuse; Maroon, Red, Brown or White Wires Shorted, Bad Servo.