

1991 Chevrolet S10 Pickup

I - SYSTEM/COMPONENT TESTS System & Component Testing

ENGINE SENSORS & SWITCHES

A/C ON SWITCH SYSTEM TEST

1. Turn ignition switch to RUN position. Move mode selector switch to OFF position. With A/C control assembly connector connected, measure voltage between mode selector switch Dark Green wire (Light Green/Black on Astro and Safari) and ground. For wiring schematics, see mini-schematics in A/C CLUTCH under MISCELLANEOUS ECM CONTROLS.
2. Battery voltage should be present. If battery voltage is present, mode selector switch is operating normally. If battery voltage is not present, check wire from selector switch to fuse for an open circuit. Also check A/C high and low pressure switches for open.
3. Check voltage between mode selector Dark Green or Light Green/Black wire and ground. Voltage should not be present. If voltage was present, replace mode selector switch.

BRAKE SWITCH

Disconnect brake switch harness connector. Using an ohmmeter, check continuity between brake switch terminals. Continuity should be present. Depress brake pedal or activate brake switch, continuity should not be present.

COOLANT TEMPERATURE SENSOR (CTS)

If a coolant sensor-related code is present, see appropriate article below:

- TESTS W/CODES - DIESEL
- TESTS W/CODES - GASOLINE

An out-of-calibration sensor may not set a trouble code. Use following procedure to test sensor calibration. Disconnect coolant temperature sensor connector. Measure resistance between sensor terminals. Resistance should be high when engine is cold and drop as engine warms up. See CTS RESISTANCE VALUES table.

CTS RESISTANCE VALUES

Temperature °F (°C)	Resistance (Ohms)
210 (100)	185
160 (70)	450
100 (38)	1800
70 (20)	3400
20 (-7)	13,500
0 (-18)	25,000
-40 (-40)	100,700

KNOCK SENSOR

1. Disconnect knock sensor harness connector. Using an ohmmeter, measure knock sensor resistance between sensor terminal and engine block. Resistance should be 3300-4500 ohms. Connect voltmeter

between sensor terminal and ground. Set voltmeter to 2-volt AC scale.

2. Start and idle engine. Tap on engine block near sensor. A signal should be indicated on voltmeter. If no signal is indicated, replace knock sensor. Also see TIMING CONTROL SYSTEMS in this article and appropriate article below:

- TESTS W/CODES - DIESEL
- TESTS W/CODES - GASOLINE

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

1. A malfunction in the MAP sensor circuit should set a related code in ECM memory. If a code is present, see appropriate article below:

- TESTS W/CODES - DIESEL
- TESTS W/CODES - GASOLINE

An out-of-calibration sensor may not set a trouble code. Use following procedure to test sensor calibration. If driveability problems exist, MAP sensor failure is suspected and no MAP code is present, disconnect MAP sensor connector. If driveability condition improves, replace MAP sensor. Before replacing MAP sensor, check MAP vacuum hose for splits, kinks, proper routing and blockage.

2. With ignition on and engine off, check MAP sensor parameter using a Scan tester connected to the ALDL connector. Voltage should be as specified in MAP SENSOR VOLTAGE RANGE table. If MAP sensor voltage is as specified, go to next step. If voltage is not as specified, check for 5-volt reference supplied to sensor. Check harness integrity. If no problems are evident, replace MAP sensor.
3. Using a hand-held vacuum pump, apply 10 in. Hg to MAP sensor and note voltage change. Voltage should drop to about 1.0-1.5 volts less than specified in table. If voltage is not as specified or voltage reading does not immediately follow vacuum change, MAP sensor is faulty.

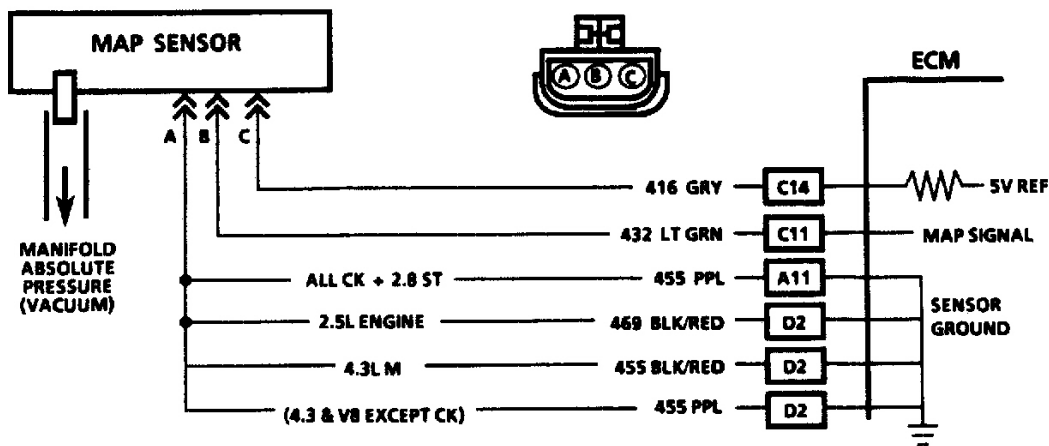


Fig. 1: Typical MAP Sensor Circuit
 Courtesy of GENERAL MOTORS CORP.

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MAP SENSOR VOLTAGE RANGE

Altitude (Ft.)	Range (Volts)
Below 1000	3.8-5.5
1000-2000	3.6-5.3
2000-3000	3.5-5.1
3000-4000	3.3-5.0
4000-5000	3.2-4.8
5000-6000	3.0-4.6
6000-7000	2.9-4.5
7000-8000	2.8-4.3
8000-9000	2.6-4.2
9000-10,000	2.5-4.0

MANIFOLD AIR TEMPERATURE (MAT) SENSOR

If a MAT sensor-related code is present, see the appropriate article below:

- **TESTS W/CODES - DIESEL**
- **TESTS W/CODES - GASOLINE**

An out-of-calibration sensor may not set a trouble code. Use following procedure to test calibration. Disconnect MAT sensor harness connector. Connect ohmmeter between sensor terminals. Sensor resistance should be as specified. See MAT SENSOR RESISTANCE table. With vehicle sitting overnight, MAT sensor and coolant sensor should have close to the same resistance reading.

MAT SENSOR RESISTANCE

Temperature °F (°C)	Resistance (Ohms)
210 (100)	185
160 (70)	450
100 (38)	1800
70 (20)	3400
40 (4)	7500
20 (-7)	13,500
0 (-18)	25,000
-40 (-40)	100,700

OXYGEN (O2) SENSOR

1. Start engine and warm to operating temperature. Disconnect oxygen sensor. Connect a DVOM between Purple lead of oxygen sensor and ground. Place meter on the 2-volt scale.
2. Using another DVOM on the 20-volt scale, connect voltmeter in series between Purple wire from the ECM and the positive post of battery. This will simulate a rich condition, causing ECM to respond by leaning mixture. Reading on voltmeter connected to oxygen sensor should decrease to a low voltage (less

than .3 volt).

3. Move voltmeter lead from positive battery post to negative battery post. This will simulate a lean condition, causing ECM to respond by richening mixture. Reading on voltmeter connected to oxygen sensor should increase (greater than .8 volt). If reading does not change as specified, replace O2 sensor.
4. If a second DVOM is not available, install short jumper in Purple wire from the ECM. Hold jumper in one hand and touch positive post of battery with other hand to simulate a rich condition. Touch negative post of battery to simulate a lean condition. For additional testing procedures, see appropriate article below:

- TESTS W/CODES - DIESEL
- TESTS W/CODES - GASOLINE

OXYGEN SENSOR HEATING ELEMENT (4.3L TURBO PFI)

Disconnect 3-wire connector at oxygen sensor. Measure resistance between White wire terminals on sensor side of connector. Resistance should be 3.5-14 ohms. If resistance is not 3.5-14 ohms, replace oxygen sensor.

PARK/NEUTRAL (P/N) SWITCH

Disconnect P/N switch (located on transmission) harness connector. Connect ohmmeter between the P/N switch terminals. See **Fig. 2**. Continuity should be present only when gear shift selector is in Park or Neutral. If continuity is not present, check P/N switch adjustment or replace defective P/N switch.

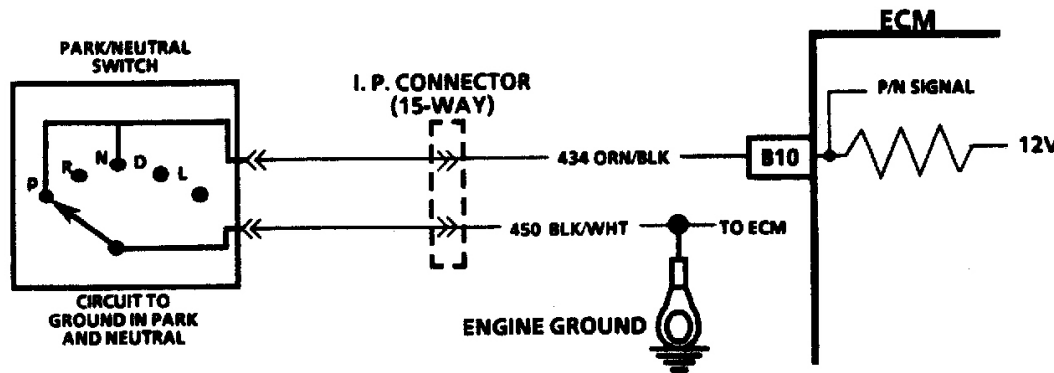


Fig. 2: Typical P/N Switch Circuit
 Courtesy of GENERAL MOTORS CORP.

POWER STEERING PRESSURE SWITCH (2.5L)

Disconnect P/S pressure switch harness connector. Connect ohmmeter between P/S pressure switch terminals. Start engine. With no load on power steering, continuity should not be present. Turn steering wheel to full stop, continuity should now be present. If readings are not as specified, replace defective P/S pressure switch.

THROTTLE POSITION SENSOR (TPS)

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1. Install jumper wires to enable connection of a DVOM in parallel between TPS harness connectors. Connect DVOM positive lead to Dark Blue wire terminal. Connect negative lead to Black wire terminal. See **Fig. 3**.
2. Turn ignition on, engine off. Signal voltage should gradually change from less than one volt at closed throttle to about 5.0 volts at wide open throttle position. If reading is not as specified, adjust or replace TPS. See **ADJUSTMENTS** article in this section.
3. A malfunction in the TPS circuit should set a related trouble code. For further information, see appropriate article below:
 - **TESTS W/CODES - DIESEL**
 - **TESTS W/CODES - GASOLINE**
 - **TESTS W/CODES - TRANSMISSION** (If Transmission Codes Are Displayed)

Also refer to TPS adjustment procedure in **ADJUSTMENTS** article in this section.

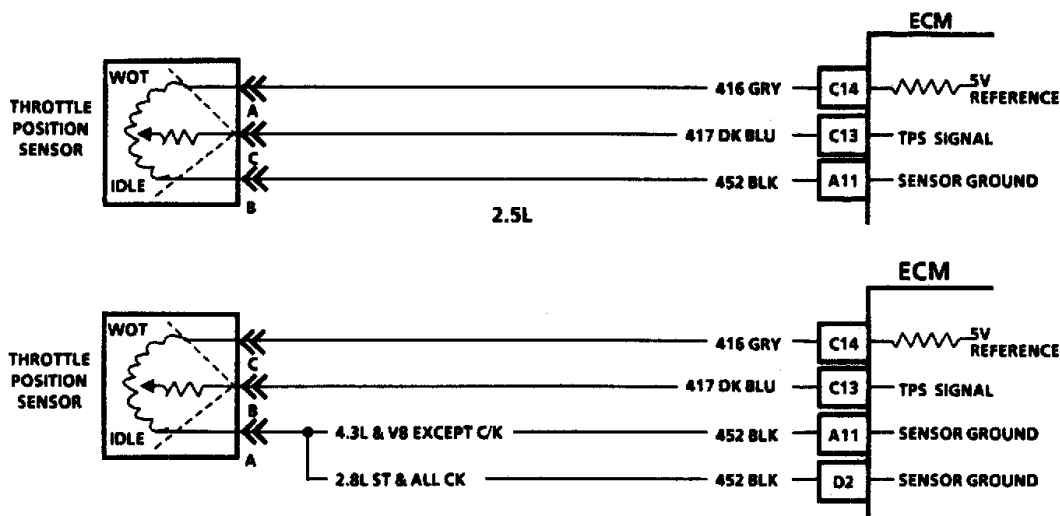


Fig. 3: Typical Throttle Position Sensor Circuit
Courtesy of GENERAL MOTORS CORP.

VEHICLE SPEED SENSOR (PM GENERATOR TYPE)

Disconnect vehicle speed sensor harness connector (located in transmission/transaxle). Place gear selector in Neutral. Raise vehicle drive wheels off the ground. Turn drive wheels by hand (greater than 3 MPH). Measure AC signal voltage between sensor terminals. Voltage reading should be varying from 0.1-0.5 volt AC as the wheel is turned. If reading is not as specified, replace vehicle speed sensor. If a code is set, refer to appropriate article below:

- **TESTS W/CODES - DIESEL**
- **TESTS W/CODES - GASOLINE**

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- **TESTS W/CODES - TRANSMISSION** (If Transmission Codes Are Displayed)