## 1966-74 AMERICAN MOTORS

### DESCRIPTION & OPERATION

**Temperature Indicator (1966-74)** – Temperature indicator circuit is comprised of a sending unit and gauge. The gauge is grounded through the variable resistance of sending unit. Changes in coolant temperature vary resistance in sending unit, thus increasing or decreasing indication.

**Fuel Level Indicator (1966-74)** – Fuel indicator circuit is comprised of a sending unit and gauge. Sending unit is located in fuel tank. Gauge is grounded through variable resistance of sending unit. A float attached to a slide rheostat follows fuel level, and thus varies resistance, thereby increasing or decreasing indication.

**Constant Voltage Regulator (1966-69)** – The CVR is part of the fuel indicator on 1965-66 Ambassadors and Marlin and 1969 Americans. On all other models CVR is a separate unit. The CVR is connected in parallel to fuel and temperature gauges and provides the same regulated voltage to each gauge. The CVR's function is to regulate the variable input voltage available from car battery, or charging system to provide a constant 5 volt output to gauges. The CVR does not produce a steady DC voltage output, but rather a pulsating voltage averaging 5 volts. Output voltage averaging lower or higher than 5 volts will result in proportionately higher or lower gauge readings.

**Constant Voltage Regulator (1970-74)** – The CVR is part of the temperature indicator on Hornet and Gremlin series, and a separate unit on all other models. The CVR is connected in series to fuel and temperature gauges, and provides the same regulated voltage to each gauge. On 1971 models equipped with a Low Fuel Warning System, only the temperature gauge is controlled by the CVR. The CVR's function is to regulate the variable input voltage available from car battery, or charging system to provide a constant 5 volt output to gauges. The CVR does not produce a steady DC voltage output, but rather a pulsating voltage averaging 5 volts. Output voltage averaging lower or higher than 5 volts will results in proportionately higher or lower gauge readings.

### TESTING

**Oil Pressure Indicator (All Models)** – Proceed as follows to test accuracy of oil pressure gauge using a suitable variable resistance tester (J-22344-01). Disconnect wire from sending unit located on engine. Turn ignition switch on. Connect one lead of tester to a good ground and other lead to sending unit wire. Oil pressure gauge should read as follows: 0 psi at 68-73 ohms; 40 psi at 21-25 ohms; 80 psi at 7-13 ohms. Check all circuit connections before replacing gauge.

Check sender unit as follows: After verifying a proper operating gauge, remove oil sender unit and install a "T" fitting between block fitting and sender. Connect a direct reading oil pressure gauge to "T" fitting. Reconnect sender unit wire, start engine and compare reading between the two gauges. Replace sender unit if defective.

**Constant Voltage Regulator (1966-67)** – To test the voltage regulator while in vehicle, connect one lead of test lamp or voltmeter to temperature sending unit and other lead to ground, leaving sending unit wire attached to sending unit. Turn ignition switch on. A flashing light or fluctuating voltmeter indicates the CVR is operating.

To test the voltage regulator with cluster removed, connect jumper wire from positive post of a 12 volt battery to the input terminal of voltage regulator. Connect jumper wire from negative post to the cluster case (ground). Connect the negative lead of voltmeter to negative battery post and positive lead of voltmeter to input terminal of voltage regulator. Voltmeter should read 12 volts. Touch positive lead of voltmeter to output terminal of voltage regulator and a fluctuating reading between 0 to 7 volts should be shown. Same fluctuating reading should show at terminal for sending unit wire of fuel gauge. Any other readings than those indicated requires replacement of CVR unit.

**Constant Voltage Regulator (1968-74)** – *NOTE – Test does not apply to 1971 models equiped with Low Fuel Warning System.* Be sure CVR is firmly seated in printed circuit before testing. Disconnect fuel and temperature sending unit wires and connect a suitable variable resistance tester (J-22344-01) between each disconnected wire and a known good ground. Adjust tester to 10 ohms. A good fuel tank sending unit may also be used. Resistance of the unit is about 10 ohms with float arm at upper full stop.

With a 10 ohm resistance the fuel indicator should read FULL, to two needle widths above. The temperature indicator should read HOT, to two needle widths below. If both gauges read either too high or too low, the CVR is defective and must be replaced. If both gauges fluctuate more than plus or minus one half of a needle width, allow CVR to stabilize by operating engine at 1500 RPM for two minutes. CVR is defective if fluctuation continues.

**Fuel & Temperature Indicator Checks (1966-67)** – Use a suitable variable resistance tester (J-22344-01) with an ohm scale from 10-130 in one ohm increments. Remove the instrument cluster harness plug and connect tester to indicator pin for temperature gauge and ground on instrument cluster. With tester set at 73 ohms the temperature gauge should read cold. With tester set at 9 ohms temperature gauge should read hot. Replace indicator if readings are not correct.

Connect tester to indicator pin for fuel gauge and ground on instrument cluster. With tester set at 62 ohms the fuel gauge should read empty. With tester set at 11 ohms, fuel gauge should read full. Replace gauge if readings are not correct.

**Fuel Level Indicator (1966-67)** – Ensure that fuel tank is properly grounded to frame of car. Connect lead from a known good fuel sending unit to fuel lever indicator mounting terminal on rear of instrument cluster. Ground sending unit and place float to lower stop. Turn on ignition switch and panel indicator should read empty. Move float to upper stop and panel indicator should read full. If indicator does not show any movement, indicator is faulty and should be replaced. If checks indicate correct operation, the indicator is satisfactory and trouble is in wiring or sending unit. Disconnect wire leading from tank unit and connect test sending unit to this wire. Move test float to full and empty positions and observe gauge. If indicator does not show any movement, check wire for poor connection or borken wire. If indicator operates correctly, sending unit is defective.

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**Fuel Level Indicator (1968-71)** – Disconnect wire from fuel tank sending unit and connect to known good sending unit. Connect a jumper wire to good ground and turn on ignition switch. Move float arm to upper stop and indicator should read full. Lower float arm to bottom stop and indicator should read empty. If indicator reads correctly, the tank sending unit is defective. If indicator still reads improperly or is erratic, the indicator or wiring to the indicator is faulty. Disconnect the main harness from instrument cluster and connect lead from test sending unit to fuel indicator pin terminal on rear of instrument cluster. Connect a jumper wire from pickup tube of test sending unit to ground. Connect jumper wire from ignition terminal of main harness plug to ignition terminal of cluster. Repeat test for tank sending unit. If the indicator does not read correctly or is erratic, indicator is defective and must be replace. If indicator reads correctly, wire between the indicator and tank unit is defective and must be repaired.

**Temperature Indicator (1968-71)** – Use a suitable variable resistance tester (J-22344-01) with an ohm scale from 10-130 in one ohm increments. Disconnect terminal plug from sending unit and turn ignition switch on. Place one lead of tester in terminal plug and ground other lead of tester. Turn tester controls to select ohm values (see illustration) and observe gauge needle. If other than the correct readings are obtained, the indicator or constant voltage regulator is defective. *NOTE – All ohm values are ±5% of the specified value.*

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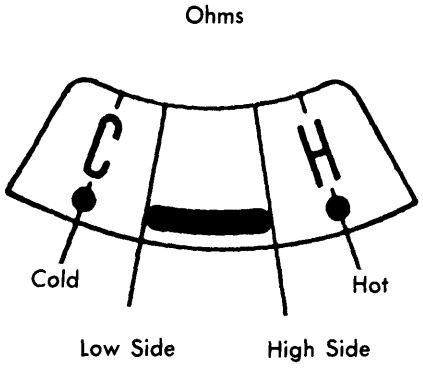


**TEMPERATURE GAUGE TEST BAND**

| FUEL GAUGE CALIBRATION (OHMS) | | | | | |
|---|---|---|---|---|---|
| Series | E | 1/4 | 1/2 | 3/4 | F |
| HORNET | 62 | 34 | 25 | 18 | 12 |
| MATADOR, AMBASSADOR | 61 | 37 | 26 | 19 | 11 |
| GREMLIN | 62 | 34 | 25 | 18 | 12 |
| JAVELIN | 59 | 34 | 25 | 18 | 12 |

**Fuel & Temperature Indicators (1972-74)** – Use a suitable variable resistance tester (J-22344-01) with an ohm scale from 10-130 in one ohm increments. Tester is to be used on ground side of gauge to simulate operation of sender unit.

To test at sender unit: Disconnect wires at sending unit. Connect one lead of tester to disconnected wire and other lead to ground. Turn ignition on. Turn tester controls to select ohm values (see table) and observe gauge.

If gauge reading is accurate for each ohm value selected, the trouble is in sending unit or sending unit ground circuit. After being sure sending unit ground circuit is good, replace sending unit. If gauge reading is not accurate for each ohm value selected, no gauge reading is obtained, or gauge needle is pegged above the FULL or HOT position, disconnect test leads and reconnect sender unit wire and proceed to following tests.

To test at instrument cluster: Disconnect battery cable. Remove instrument cluster, and disconnect instrument wire harness. Connect a jumper wire in series with a four amp fuse between battery voltage source and ignition pin terminal of printed circuit. Connect a jumper wire between CVR case and ground. Hornet and Gremlin models do not have an external CVR circuit; in this case, connect the jumper wire to printed circuit ground screw.

Observe the following: Be sure printed circuit screws are tight. Do not test gauges with printed circuit removed. Do not apply battery voltage directly to gauge input terminals with a jumper wire. Do not disconnect ground jumper wire until battery voltage source jumper wire has been disconnected to prevent system voltage from being applied directly to gauges.

Connect one tester lead to output terminal of gauge and other lead to ground. Reconnect battery cable. Observe gauge reading while selecting ohm values (see charts). Fuel and temperature gauges are 5% meters, that is they must be accurate within 5% of a specific ohm value.

## TROUBLE SHOOTING

**Gauge Reading Unsatisfactory At Each Ohm Value Selected** – Possible trouble spots are as follows: Gauge output terminal to printed circuit connection. Printed circuit between gauge output terminal and gauge indicator pin terminal. Sending wire or wire harness connections. Ignition terminals of instrument harness connector. Fuse or connections.

**No Gauge Reading** – Possible trouble spots are as follows: Gauge terminals to printed circuit connections. Printed circuit between gauge input terminal and ignition pin terminal. Radio suppressor or connector strap. Defective gauge.

**Gauge Reads FULL or HOT At All Ohm Values** – Defective gauge.

**Temperature And Fuel Gauge Both Read Too High or Too Low** – CVR unit defective. Bad case ground on vehicles with external CVR. Temperature gauge to instrument panel case ground bad on vehicles with external CVR.

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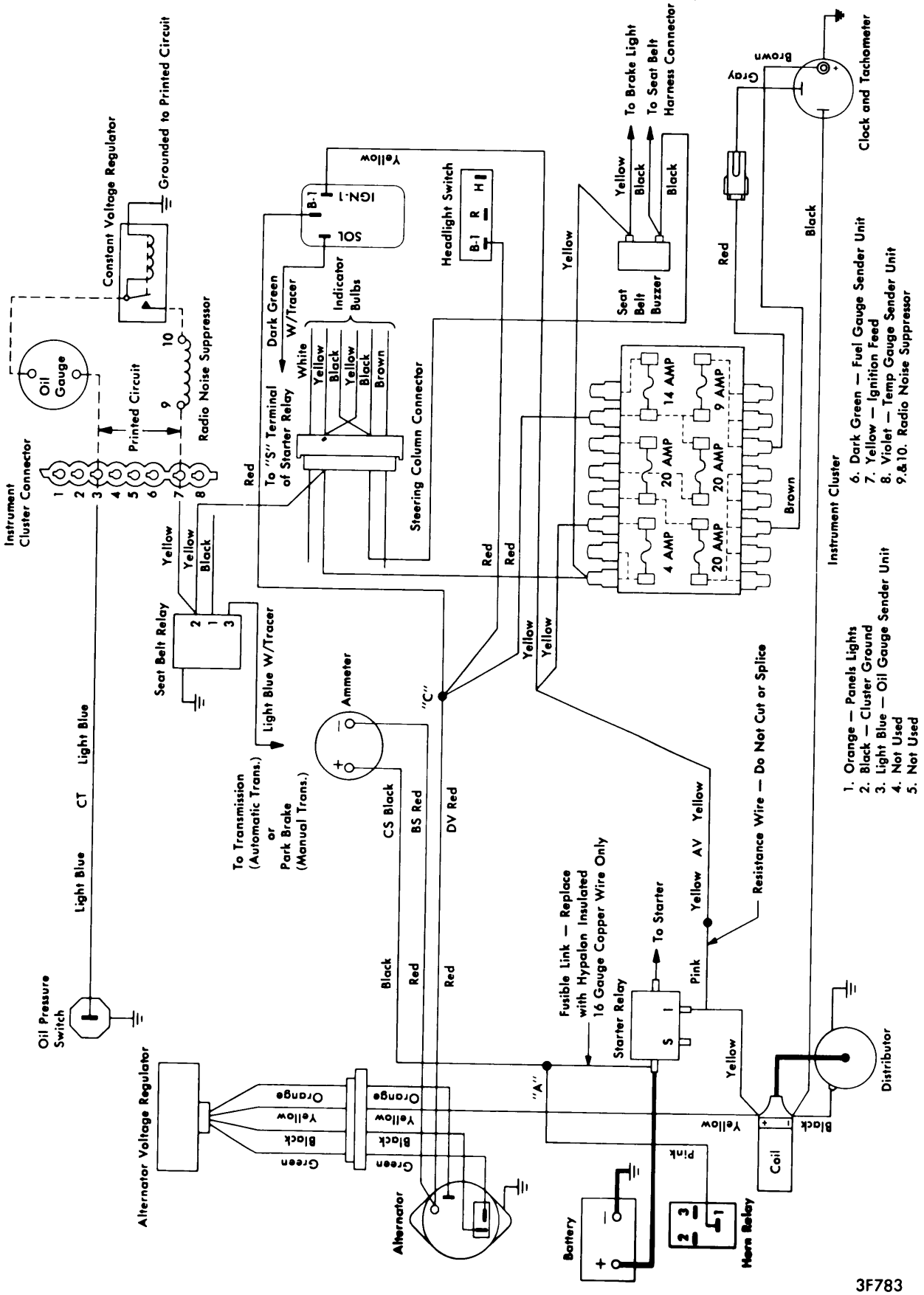


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**AMMETER & OIL PRESSURE GAUGE WIRING – JAVELIN**