1990 DEALER SERVICE MANUAL
UPDATE BULLETIN SUPPLEMENT
FOR THE 1990 CHEVROLET LIGHT DUTY TRUCK UNIT REPAIR, ASTRO VAN, C-K PICKUP TRUCKS, R-V-G-P MODELS, AND S-10 MODELS SERVICE MANUALS

ST-502-90SB
CAUTION

To reduce the chance of personal injury and/or property damage the following instructions must be carefully observed:

Proper service and repair are important to the safety of the service technician and the safe, reliable operation of all motor vehicles. If part replacement is necessary, the part must be replaced with one of the same part number or with an equivalent part. Do not use a replacement part of lesser quality.

The service procedures recommended and described in this service manual are effective methods of performing service and repair. Some of these procedures require the use of tools specially designed for the purpose.

Accordingly, anyone who intends to use a replacement part, service procedure or tool, which is not recommended by the vehicle manufacturer, must first determine that neither his safety nor the safe operation of the vehicle will be jeopardized by the replacement part, service procedure or tool selected.

It is important to note that this manual contains various "Cautions" and "Notices" that must be carefully observed in order to reduce the risk of personal injury during service or repair, or the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these "Cautions" and "Notices" are not exhaustive, because it is impossible to warn of all the possible hazardous consequences that might result from failure to follow these instructions.

This manual contains Dealer Service Update Bulletins covering service manual updates which were issued September 1989 through August 1990. Some pages may apply to prior or later model years. It will also be necessary to check bulletins issued after August 1990.

Any reference to brand names in this manual is intended merely as an example of the types of lubricants, tools, and materials recommended for use. In all cases, an equivalent may be used.

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.
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</tr>
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TO: ALL CHEVROLET DEALERS

ATTACHED FOR YOUR INFORMATION ARE THE 1990 MODEL WHEEL ALIGNMENT SPECIFICATIONS FOR ALL GM PASSENGER CARS AND LIGHT TRUCKS.

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### 1990 GM PASSENGER CAR ALIGNMENT SPECIFICATIONS (DEGREES)

<table>
<thead>
<tr>
<th>CAR LINE</th>
<th>CAMBER</th>
<th>CROSS</th>
<th>FRONT WHEELS</th>
<th>CASTER</th>
<th>CROSS</th>
<th>TOTAL TOE</th>
<th>STEERING WHEEL ANGLE</th>
<th>CAMBER</th>
<th>TOTAL TOE</th>
<th>THRUST ANGLE</th>
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<tbody>
<tr>
<td>A</td>
<td>0.00 +/- .50</td>
<td>0.70</td>
<td>1.70 +/- 0.70</td>
<td>0.70</td>
<td>0.00 +/- 0.20</td>
<td>+/- 3.5</td>
<td>0.00 +/- .30</td>
<td>0.00 +/- .30</td>
<td>0.00 +/- .15</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>+0.90 +/- 80</td>
<td>1.00</td>
<td>2.80 +/- 1.00</td>
<td>1.00</td>
<td>+0.10 +/- 0.20</td>
<td>+/- 2.5</td>
<td>0.00 +/- .50</td>
<td>0.00 +/- .20</td>
<td>0.00 +/- .15</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>+0.30 +/- .50</td>
<td>0.70</td>
<td>4.80 +/- 0.50</td>
<td>0.70</td>
<td>0.00 +/- 0.20</td>
<td>+/- 3.5</td>
<td>0.00 +/- .30</td>
<td>0.00 +/- .15</td>
<td>(ref. only)</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>+0.50 +/- .60</td>
<td>-0.20 +/- 0.60</td>
<td>1.00</td>
<td>1.15 +/- 0.75</td>
<td>0.70</td>
<td>0.00 +/- 0.20</td>
<td>+/- 3.5</td>
<td>-0.25 +/- 0.50</td>
<td>+0.30 +/- .25</td>
<td>0.00 +/- .35</td>
</tr>
<tr>
<td>J/IN</td>
<td>0.00 +/- .70</td>
<td>1.00</td>
<td>1.70 +/- 1.00</td>
<td>0.70</td>
<td>0.00 +/- 0.20</td>
<td>+/- 5.0</td>
<td>0.25 +/- 0.50</td>
<td>0.00 +/- .15</td>
<td>0.10 +/- .15</td>
<td></td>
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<tr>
<td>W</td>
<td>+0.70 +/- .50</td>
<td>0.75</td>
<td>2.00 +/- 0.50</td>
<td>0.75</td>
<td>0.00 +/- 0.20</td>
<td>+/- 4.0</td>
<td>-0.10 +/- .50</td>
<td>0.00 +/- .15</td>
<td>0.00 +/- .15</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td>+0.50 +/- .50</td>
<td>1.00</td>
<td>5.80 +/- 0.80</td>
<td>1.00</td>
<td>0.00 +/- 0.20</td>
<td>+/- 2.0</td>
<td>+0.20 +/- 0.50</td>
<td>+0.20 +/- .20</td>
<td>0.00 +/- .15</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>-0.25 +/- .75</td>
<td>1.50</td>
<td>0.90 +/- 0.75</td>
<td>1.50</td>
<td>+0.08 +/- .31</td>
<td>+/- 4.0</td>
<td>-0.05 +/- .75</td>
<td>+0.30 +/- .31</td>
<td>0.00 +/- .15</td>
<td></td>
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<tr>
<td>M/R</td>
<td>+0.31 +/- 1.00</td>
<td>1.00</td>
<td>2.25 +/- 0.50</td>
<td>1.00</td>
<td>0.00 +/- .34</td>
<td>+/- 5.0</td>
<td>0.00 +/- .75</td>
<td>0.43 +/- .43</td>
<td>0.00 +/- .15</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**  ▲ NOT ADJUSTABLE

### 1990 GENERAL MOTORS TRUCK WHEEL ALIGNMENT SPECIFICATIONS (DEGREES)

<table>
<thead>
<tr>
<th>TRUCK LINE</th>
<th>CAMBER</th>
<th>CROSS</th>
<th>CASTER</th>
<th>CROSS</th>
<th>TOTAL TOE</th>
<th>STEERING WHEEL ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-K</td>
<td>+.50 +/- .50</td>
<td>1.00</td>
<td>3.75 +/- 1.00</td>
<td>1.00</td>
<td>+.24 +/- .20</td>
<td>± 5.0</td>
</tr>
<tr>
<td>G-10/20</td>
<td>+.50 +/- .75</td>
<td>1.00</td>
<td>* +/- 1.00</td>
<td>1.00</td>
<td>0 +/- .20</td>
<td>± 5.0</td>
</tr>
<tr>
<td>G-30</td>
<td>+.25 +/- .75</td>
<td>1.00</td>
<td>2.60 +/- 1.00</td>
<td>1.00</td>
<td>0 +/- .20</td>
<td>± 5.0</td>
</tr>
<tr>
<td>M</td>
<td>+.80 +/- .80</td>
<td>1.00</td>
<td>3.52 +/- 1.00</td>
<td>1.00</td>
<td>-.10 +/- .20</td>
<td>± 5.0</td>
</tr>
<tr>
<td>L ALL WD</td>
<td>+.91 +/- 1.00</td>
<td>1.00</td>
<td>1.70 +/- 1.00</td>
<td>1.00</td>
<td>0 +/- .20</td>
<td>± 5.0</td>
</tr>
<tr>
<td>P</td>
<td>+.25 +/- .75</td>
<td>1.00</td>
<td>* +/- 1.00</td>
<td>1.00</td>
<td>+.34 +/- .23</td>
<td>± 5.0</td>
</tr>
<tr>
<td>S-T</td>
<td>+.80 +/- .80</td>
<td>1.00</td>
<td>1.80 +/- 1.00</td>
<td>1.00</td>
<td>+.30 +/- .20</td>
<td>± 5.0</td>
</tr>
<tr>
<td>R-10</td>
<td>+.70 +/- .75</td>
<td>1.00</td>
<td>* +/- 1.00</td>
<td>1.00</td>
<td>+.15 +/- .23</td>
<td>± 5.0</td>
</tr>
<tr>
<td>R-20/30</td>
<td>+.25 +/- .75</td>
<td>1.00</td>
<td>8.00 +/- 1.00</td>
<td>1.00</td>
<td>0 +/- .23</td>
<td>± 5.0</td>
</tr>
</tbody>
</table>

**NOTES:**  Actual Corrected Caster Angle = Wheel Angle + Frame Rail Angle  
(Frame Angle is negative when lower in rear, and positive when lower in front.)

V VEHICLE caster and camber are not adjustable.
TO: ALL CHEVROLET DEALERS

This bleed procedure revises the bleed procedure published in the 1990 Light Duty Truck Service Manual Section 5 (reference Dealer Service Bulletin No. 90-65-5). This procedure is correctly listed in the 1991 S/T service manual as it applies to that model. Please place a copy of this bulletin in the 1990 Light Duty Truck Service Manual.

The following brake bleeding procedure is to be used on ALL 1990 M/L Vans equipped with 4 wheel anti-lock brake systems.

IMPORTANT: The ignition switch must be off through-out bleeding or false trouble codes could be set to memory.

4WAL Brake System Bleeding Procedure:

1. Assure ignition is in off position.
2. Deplete brake booster by pumping the brake pedal several times.
3. Assure the master cylinder is full.
4. Install two J 35856 bleed valve tools on the 4WAL EHCU at the high pressure accumulators (HPA) (see Figure 2).
5. Install one J 35856 bleed valve tool on the combination valve.
6. There are internal bleed screws on each side of the EHCU module (Figure 2). The bleed screws are used to open the internal passages within the EHCU module. Back off the two internal bleed screws 1/4 to 1/2 turn.
7. Use conventional bleeding process; Pressure, Vacuum or Pedal Bleeding.

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IMP0RTANT: The EHCU module should be bled after replacement or if trapped air is thought to be in the unit. It should not be necessary to bleed the EHCU module if the fluid has not become contaminated or if no air is thought to be in the module. In the event the EHCU module needs to be bled the module should be thoroughly bled BEFORE the wheel cylinders and calipers.

There are two bleeders on the front of the unit that look like normal brake bleeders (Figure 2). These are the modulator bleeders for bleeding the EHCU module and they must remain closed when the unit is not pressurized.

8. EHCU Module Bleed Procedure (if required). Pedal bleeding method described below:

- Slowly depress the brake pedal one time and hold.
- Open one of the modulator bleeders on the front of the unit until fluid flows clearly or pedal is depressed.
- Close the modulator bleeder and tighten to 7 Nm. (60 in.lbs). DO NOT OVER TIGHTEN!
- Slowly release the pedal.
- Wait 15 seconds, then repeat the above sequence, including the 15 second wait until all air is purged from the EHCU module.

Repeat the above process on the remaining modulator bleeder on the front of the EHCU module until all air is purged from the unit.

9. Always maintain a full master cylinder.

10. Bleed wheel cylinders and calipers as described in HYDRAULIC BRAKES (Sec. 5A of the service manual).

11. Remove the three J 35856 bleed valve tools.

12. Close the left internal bleed screw and tighten to 7 Nm (60 in.lbs.). DO NOT OVER TIGHTEN!

13. Close the right internal bleed screws and tighten to 7 Nm (60 in.lbs.). DO NOT OVER TIGHTEN!

14. Start vehicle and evaluate the brake pedal feel. If firm, continue with this procedure. If the pedal is soft or spongy, reinstall tools and re-bleed the system starting with step 1. Any RE-BLEED due to soft or spongy pedal should always include bleeding the EHCU module (step 9).
15. Perform 3 function tests using the Tech-1 Function test procedure.

16. Road test vehicle.

IMPORTANT: Failure to follow this procedure accurately may result in an immediate soft pedal after the first anti-lock stop and technician induced stored codes.
Figure 1 4WAL EHCU Assembly Mounting—M/L Series

Figure 2 4WAL EHCU Service Bleed Valves

Modulator Bleeders
EHCU Module
HPA Pins
Internal Bleed Screw (Left Side of EHCU, Right Side Opposite)
TO: ALL CHEVROLET DEALERS

The attached chart (see Figure 1) is a revised code 5 diagnostic chart. The revised chart requires a check of wiring and the transfer case switch operation before the control valve is replaced on 4-wheel drive vehicles. The chart also revises code 5 diagnostic information in the following service manuals:

- 1988 C/K
- 1989 C/K
- 1990 C/K
- 1990 R/V AND G
- 1989 S/T
- 1990 S/T
- 1989 M VAN
- 1990 M VAN

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CODE 5
EXCESSIVE ACTUATIONS OF THE DUMP VALVE
DURING AN ANTILOCK STOP

IGNITION “ON”
GROUND THE DIAGNOSTIC TERMINAL
FROM DIAGNOSTIC CIRCUIT CHECK

BRAKE LIGHT FLASHERS CODE 5
IGNITION “OFF”

IS THE VEHICLE EQUIPPED WITH 4WD?
YES
ENGAGE 4WD
4WD INDICATOR “ON”
YES
CHECK VOLTAGE AT BRAKE LAMP SWITCH TERMINAL A WITH THE BRAKES APPLIED (CKT 420)
12 VOLTS
CHECK VOLTAGE AT PIN F OF THE MODULE CONNECTOR (CKT 420)
12 VOLTS
REPAIR WIRING
0 VOLTS
REPLACE TRANSFER CASE SWITCH
12 VOLTS
REPAIR WIRING
IGNITION “OFF”

NO
REPLACE THE VALVE ASSEMBLY. REFER TO ISOLATION/DUMP VALVE IN THIS SECTION.

VERIFY OPERATION OF THE REAR BRAKES. REPAIR IF NECESSARY

NO
REPAIR, REFER TO TRANSFER CASE

CHECK VOLTAGE AT SINGLE CAVITY CONNECTOR FROM TRANSFER CASE SWITCH
0 VOLTS
REPAIR WIRING
12 VOLTS
REPAIR WIRING

ALDL CONNECTOR (DIAGNOSTIC TERMINAL)

ECM B fuse on S/T-Series truck.
Stop/hazard fuse on C/K- and RV-Series truck.
Hom/dome fuse on M-Series truck.
Tail LPS fuse on G-Series truck.

Figure 1
Subject: CONTROLLED IDLE SPEED UPDATED CHART

Model and Year: 1990 ALL TRUCKS (EXCEPT TRACKER)

TO: ALL CHEVROLET DEALERS

This bulletin updates the chart shown on Page 4-43 in the Fuel Control Section of the 1990 Shop Manual. This information is for all 1990 Light-duty trucks (except Tracker) with gas engines.

### 1990 CONTROLLED IDLE SPEED

<table>
<thead>
<tr>
<th>ENGINE</th>
<th>TRANS</th>
<th>GEAR (D/N)</th>
<th>IDLE SPEED (RPM)</th>
<th>IAC COUNTS*</th>
<th>OPEN/CLOSED LOOP**</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5L</td>
<td>MAN.</td>
<td>N</td>
<td>950(S)</td>
<td>5-20</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>AUTO.</td>
<td>D</td>
<td>800(S)</td>
<td>15-40</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>750(M)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.8L</td>
<td>MAN.</td>
<td>N</td>
<td>800</td>
<td>5-20</td>
<td>OPEN</td>
</tr>
<tr>
<td>3.1L</td>
<td>AUTO.</td>
<td>D</td>
<td>650</td>
<td>5-15</td>
<td>CLOSED</td>
</tr>
<tr>
<td>4.3L</td>
<td>MAN.</td>
<td>N</td>
<td>550</td>
<td>2-20</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>AUTO.</td>
<td>D</td>
<td>537</td>
<td>10-25</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>AUTO.(1)</td>
<td>D</td>
<td>500</td>
<td>5-30</td>
<td>CLOSED</td>
</tr>
<tr>
<td>8500</td>
<td>MAN.(1)</td>
<td>D</td>
<td>600</td>
<td>5-30</td>
<td>CLOSED</td>
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<td>588</td>
<td>10-25</td>
<td>CLOSED</td>
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<td>MAN.</td>
<td>N</td>
<td>650</td>
<td>12-30</td>
<td>CLOSED</td>
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<tr>
<td></td>
<td>AUTO.</td>
<td>D</td>
<td>650</td>
<td>20-35</td>
<td>CLOSED</td>
</tr>
<tr>
<td>(over</td>
<td>AUTO.</td>
<td>D</td>
<td>650</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8500 GVW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0L</td>
<td>MAN.</td>
<td>N</td>
<td>600</td>
<td>5-30</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>AUTO.</td>
<td>D</td>
<td>500</td>
<td>5-30</td>
<td>CLOSED</td>
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<tr>
<td></td>
<td>AUTO.(3)</td>
<td>D</td>
<td>500</td>
<td>5-30</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>

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GSD148J Rev. 12/89
<table>
<thead>
<tr>
<th>ENGINE</th>
<th>TRANS</th>
<th>GEAR (D/N)</th>
<th>IDLE SPEED (RPM)</th>
<th>IAC COUNTS*</th>
<th>OPEN/CLOSED LOOP**</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.7L (under 8500 GVW)</td>
<td>MAN.</td>
<td>N</td>
<td>600</td>
<td>5-30</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>AUTO.</td>
<td>D</td>
<td>525</td>
<td>5-30</td>
<td>CLOSED</td>
</tr>
<tr>
<td>5.7L (over 8500 GVW)</td>
<td>MAN.</td>
<td>N</td>
<td>650</td>
<td>5-30</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>MAN.(4)</td>
<td>D</td>
<td>650</td>
<td>5-30</td>
<td>CLOSED***</td>
</tr>
<tr>
<td>7.4L (under 8500 GVW)</td>
<td>MAN.</td>
<td>N</td>
<td>800</td>
<td>5-30</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>AUTO.</td>
<td>D</td>
<td>750</td>
<td>5-30</td>
<td>OPEN</td>
</tr>
<tr>
<td>7.4L (above 8500 GVW)</td>
<td>MAN.</td>
<td>N</td>
<td>750</td>
<td>5-30</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>AUTO.</td>
<td>D</td>
<td>750</td>
<td>5-30</td>
<td>OPEN</td>
</tr>
</tbody>
</table>

* Add 2 counts for engines with less than 500 miles.
  Add 2 counts for every 1000 ft. above sea level (4.3L & V8).
  Add 1 count for every 1000 ft. above sea level (2.5L & 2.8L).
** Let engine idle until proper fuel control status (open/closed loop) is reached.
*** Switches to open loop after 3 min.
(1) 4.3L S/T-series.
(2) 4.3L High-Output M/L-van series.
(3) 3-Speed Automatic in a C10 pickup with Federal emissions and no A.I.R. system.
(4) G-van or Suburban with a single catalytic converter.
TO: ALL CHEVROLET DEALERS

This bulletin revises the Manifold Absolute Pressure (MAP) Output Check Chart C-1D and updates Code 33, Code 34, Code 63, and Code 64 in the Service Manual section on "Driveability And Emissions" (Section 6E1, 6E2, and 6E3). This information applies to all MAP Sensors on 1980-1990 vehicles with gasoline engines (except turbocharged) with green (standard) MAP sensor electrical connector insert or the solid black MAP sensor electrical connector insert.

The revised chart and facing page information is as follows:
- Diagnostic Chart C-1D and facing page.

The updated chart and facing page information is as follows:
- Diagnostic Chart Code 33 and facing page.
- Diagnostic Chart Code 34 and facing page.
- Diagnostic Chart Code 63 and facing page.
- Diagnostic Chart Code 64 and facing page.

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**Circuit Description:**

The Manifold Absolute Pressure (MAP) sensor measures the changes in the intake manifold pressure which result from engine load (intake manifold vacuum) and rpm changes; and converts these into a voltage output. The ECM sends a 5 volt reference voltage to the MAP sensor. As the manifold pressure changed, the output voltage of the sensor also changes. By monitoring the sensor output voltage, the ECM knows the manifold pressure. A lower pressure (low voltage) output voltage will be about 1 - 2 volts at idle. While higher pressure (high voltage) output voltage will be about 4 - 4.8 at Wide Open Throttle (WOT). The MAP sensor is also used, under certain conditions, to measure barometric pressure, allowing the ECM to make adjustments for different altitudes. The ECM uses the MAP sensor to control fuel delivery and ignition timing.

**Test Description:** Numbers below refer to circled numbers on the diagnostic chart.

---

1. **Important**

   - Be sure to use the same Diagnostic Test Equipment for all measurements.
   - When comparing "Scan" readings to a known good vehicle, it is important to compare vehicles that use a MAP sensor having the same color insert or having the same "Hot Stamped" number. See figures on facing page.
   - Applying 34 kPa (10" Hg) vacuum to the MAP sensor should cause the voltage to change. Subtract second reading from the first. Voltage value should be greater than 1.5 volts. Upon applying vacuum to the sensor, the change in voltage should be instantaneous. A slow voltage change indicates a faulty sensor.

2. Check vacuum hose to sensor for leaking or restriction. Be sure that no other vacuum devices are connected to the MAP hose.

   **NOTE:** Make sure electrical connector remains securely fastened.

3. Disconnect sensor from bracket and twist sensor by hand (only) to check for intermittent connection. Output changes greater than 1 volt indicate a bad connector or connection. If OK, replace sensor.

90-199-6E
MANIFOLD ABSOLUTE PRESSURE (MAP) VOLTAGE OUTPUT CHECK

NOTE: THIS CHART ONLY APPLIES TO MAP SENSORS HAVING GREEN OR BLACK COLOR KEY INSERT (SEE BELOW).

1. IGNITION "ON," ENGINE "OFF.
   "SCAN" TOOL SHOULD INDICATE A MAP SENSOR VOLTAGE.
   COMPARE THIS READING WITH THE READING OF A KNOWN GOOD VEHICLE. SEE FACING PAGE TEST DESCRIPTION, STEP 1.
   VOLTAGE READING SHOULD BE WITHIN, ± .4 VOLT.
   IS IT?

   YES
   NO

   DISCONNECT AND PLUG VACUUM SOURCE TO MAP SENSOR.
   CONNECT A HAND VACUUM PUMP TO MAP SENSOR.
   START ENGINE.
   NOTE MAP SENSOR VOLTAGE.
   APPLY 34 kPa (10" Hg) OF VACUUM AND NOTE VOLTAGE CHANGE.
   SUBTRACT SECOND READING FROM THE FIRST. VOLTAGE VALUE SHOULD BE GREATER THAN 1.5 VOLTS.
   IS IT?

   YES
   NO

   NO TROUBLE FOUND. CHECK SENSOR VACUUM SOURCE FOR LEAKAGE OR RESTRICTION. BE SURE THIS SOURCE SUPPLIES VACUUM TO MAP SENSOR ONLY.

   CHECK SENSOR CONNECTION. IF OK, REPLACE SENSOR.

Figure 1 - Color Key Insert

CLEAR CODES AND CONFIRM "CLOSED LOOP" OPERATION AND NO "SERVICE ENGINE SOON" LIGHT.

90-199-6E
CODE 33
MANIFOLD ABSOLUTE PRESSURE (MAP) OUTPUT CHECK
(SIGNAL VOLTAGE HIGH - LOW VACUUM)

Circuit Description:
The Manifold Absolute Pressure (MAP) sensor responds to changes in manifold pressure (vacuum). The ECM receives this information as a signal voltage that will vary from about 1 to 1.5 volts at closed throttle (idle) to 4.5 - 4.8 volts at wide open throttle (low vacuum).

If the MAP sensor fails, the ECM will substitute a fixed MAP value and use the Throttle Position Sensor (TPS) to control fuel delivery.

Test Description: Numbers below refer to circled numbers on the diagnostic chart.
1. This step will determine if Code 33 is the result of a hard failure or an intermittent condition.
   A Code 33 will set under the following conditions:
   • MAP signal voltage is too high (low vacuum).
   • TPS less than 2%.
   • These conditions exist longer than 5 seconds.
2. This step simulates conditions for a Code 34. If the ECM recognizes the change, the ECM and CKT 416 and CKT 432 are OK. If CKT 469 is open, there may also be a stored Code 23.

Diagnostic Aids:
With the ignition “ON” and the engine stopped, the manifold pressure is equal to atmospheric pressure and the signal voltage will be high. This information is used by the ECM as an indication of vehicle altitude. Comparison of this reading with a known good vehicle with the same sensor is a good way to check accuracy of a “suspect” sensor. Readings should be the same ± .4 volt.

A Code 33 will result if CKT 469 is open or if CKT 432 is shorted to voltage or to CKT 416.
If Code 33 is intermittent, refer to Section “B”.

NOTE: Make sure electrical connector remains securely fastened.
• Check all connections.
• Disconnect sensor from bracket and twist sensor by hand (only) to check for intermittent connections. Output changes greater than 1 volt indicates a bad connector or connection. If OK, replace sensor.
• Refer to CHART C-1D, MAP sensor voltage output check for further diagnosis.
CODE 33
MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR CIRCUIT
(SIGNAL VOLTAGE HIGH - LOW VACUUM)

1. IF ENGINE IDLE IS ROUGH, UNSTABLE, OR INCORRECT, CORRECT CONDITION BEFORE USING CHART. SEE "SYMPTOMS" IN SECTION "B".
   - ENGINE IDLING.
   - DOES "SCAN" TOOL DISPLAY A MAP VOLTAGE OF 4.0 VOLTS OR OVER?

   YES
   - IGNITION "OFF."
   - DISCONNECT MAP SENSOR ELECTRICAL CONNECTOR,
     - IGNITION "ON."
     - "SCAN" TOOL SHOULD READ A VOLTAGE OF 1 VOLT OR LESS.
     - DOES IT?

   NO
   - CODE 33 IS INTERMITTENT.
     - IF NO ADDITIONAL CODES WERE STORED, REFER TO "DIAGNOSTIC AIDS" ON FACING PAGE.

   YES
   - PROBE SENSOR GROUND CIRCUIT WITH A TEST LIGHT TO BATTERY VOLTAGE.
   - TEST LIGHT SHOULD LIGHT.
   - DOES IT?

   NO
   - CKT 432 SHORTED TO VOLTAGE, OR SHORTED TO CKT 416 OR FAULTY ECM.

   YES
   - PLUGGED OR LEAKING SENSOR VACUUM HOSE OR FAULTY MAP SENSOR.
   - REFER TO "DIAGNOSTIC AIDS" ON FACING PAGE.

   NO
   - OPEN SENSOR GROUND CIRCUIT.
DRIVEABILITY AND EMISSIONS

**CODE 34**

**MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR CIRCUIT**
**(SIGNAL VOLTAGE LOW - HIGH VACUUM)**

**Circuit Description:**

The Manifold Absolute Pressure (MAP) sensor responds to changes in manifold pressure (vacuum). The ECM receives this information as a signal voltage that will vary from about 1 to 1.5 volts at closed throttle (idle) to 4.5 - 4.8 volts at wide open throttle (low vacuum).

If the MAP sensor fails, the ECM will substitute a fixed MAP value and use the Throttle Position Sensor (TPS) to control fuel delivery.

**Test Description:** Numbers below refer to circled numbers on the diagnostic chart.

1. This step determines if **Code 34** is the result of a hard failure or an intermittent condition. A **Code 34** will set when MAP signal voltage is too low and the ignition is "ON."

2. Jumpering harness terminals "B" to "C" (5 volts to signal circuit) will determine if the sensor is at fault, or if there is a problem with the ECM or wiring.

3. The "Scan" tool may not display 5 volts. The important thing is that the ECM recognizes the voltage as more than 4 volts, indicating that the ECM and CKT 432 are OK.

**Diagnostic Aids:**

An intermittent open in CKT 432 or CKT 416 will result in a **Code 34**. With the ignition "ON" and the engine "OFF," the manifold pressure is equal to atmospheric pressure and the signal voltage will be high. This information is used by the ECM as an indication of vehicle altitude.

Comparison of this reading with a known good vehicle with the same sensor is a good way to check accuracy of a "suspect" sensor. Readings should be the same ± .4 volts. Also CHART C-1D can be used to test the MAP sensor. Refer to "Intermittents" in Section "B."

**NOTE:** Make sure electrical connector remains securely fastened.

- Check all connections.
- Disconnect sensor from bracket and twist sensor by hand (only) to check for intermittent connections. Output changes greater than .1 volt indicates a bad connector or connection. If OK, replace sensor.
- Refer to CHART C-1D, MAP sensor voltage output check for further diagnosis.

90-199-6E
CODE 34
MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR CIRCUIT
(SIGNAL VOLTAGE LOW - HIGH VACUUM)

1. ENGINE IDLING.
   DOES "SCAN" TOOL DISPLAY MAP VOLTAGE BELOW .25 VOLT?
   - YES
   - NO
   "SCAN" TOOL SHOULD READ OVER 4.7 VOLTS.
     DOES IT?

2. IGNITION "OFF."
   DISCONNECT SENSOR ELECTRICAL CONNECTOR.
   JUMPER HARNESS TERMINALS "B" TO "C".
   IGNITION "ON."
   MAP VOLTAGE SHOULD READ OVER 4.7 VOLTS.
   DOES IT?
   CODE 34 IS INTERMITTENT. IF NO ADDITIONAL
   CODES WERE STORED, REFER TO "DIAGNOSTIC
   AIDS" ON FACING PAGE.
   - YES
   - NO

3. IGNITION "OFF."
   REMOVE JUMPER WIRE.
   IGNITION "ON."
   PROBE TERMINAL "B" (MAP SIGNAL CKT)
   WITH A TEST LIGHT TO BATTERY VOLTAGE.
   "SCAN" TOOL SHOULD READ OVER 4 VOLTS.
   DOES IT?
   FAULTY CONNECTION OR
   SENSOR. (REFER TO "DIAGNOSTIC
   AIDS" ON FACING PAGE).
   - YES
   - NO

5 VOLT REFERENCE CIRCUIT OPEN
OR SHORTED TO GROUND
OR FAULTY ECM.

CKT 432 OPEN
OR CKT 432 SHORTED TO GROUND
OR CKT 432 SHORTED TO SENSOR GROUND
OR FAULTY ECM.
CODE 63

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR CIRCUIT
(SIGNAL VOLTAGE HIGH - LOW VACUUM)

Circuit Description:
The Manifold Absolute Pressure (MAP) sensor responds to changes in manifold pressure (vacuum). The ECM receives this information as a signal voltage that will vary from about 1 to 1.5 volts at closed throttle (idle) to 4.5 - 4.8 volts at wide open throttle (low vacuum).

If the MAP sensor fails, the ECM will substitute a fixed MAP value and use the Throttle Position Sensor (TPS) to control fuel delivery.

Test Description: Numbers below refer to circled numbers on the diagnostic chart.
1. Code 63 will set when:
   - Engine running.
   - Manifold pressure greater than 75.3 kPa (A/C "OFF") 81.2 kPa (A/C "ON")
   - Throttle angle less than 2%
   - Conditions met for 2 seconds.
   Engine misfire or a low unstable idle may set Code 63.

2. With the MAP sensor disconnected, the ECM should see a low voltage if the ECM and wiring are OK.

Diagnostic Aids:
With the ignition "ON" and the engine stopped, the manifold pressure is equal to atmospheric pressure and the signal voltage will be high. This information is used by the ECM as an indication of vehicle altitude. Comparison of this reading with a known good vehicle with the same sensor is a good way to check accuracy of a "suspect" sensor. Readings should be the same ± .4 volt.

If idle is rough or unstable, refer to symptoms in Section "B" for items which can cause an unstable idle. An open in CKT 455 or the connection will result in a Code 63.

NOTE: Make sure electrical connector remains securely fastened.

- Check all connections.
- Disconnect sensor from bracket and twist sensor by hand (only) to check for intermittent connections. Output changes greater than .1 volt indicates a bad connector or connection. If OK, replace sensor.
- Refer to CHART C-1D, MAP sensor voltage output check for further diagnosis.
CODE 63
MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR CIRCUIT
(SIGNAL VOLTAGE HIGH - LOW VACUUM)

1. IF ENGINE IDLE IS ROUGH, UNSTABLE OR INCORRECT, CORRECT BEFORE USING CHART. SEE SYMPTOMS IN SECTION "B".
   - ENGINE IDLING.
   - DOES "SCAN" TOOL DISPLAY A MAP VOLTAGE OF 4.0 VOLTS OR OVER?
     - YES
     - NO

2. IGNITION "OFF."
   - DISCONNECT MAP SENSOR ELECTRICAL CONNECTOR.
   - IGNITION "ON."
   - "SCAN" SHOULD READ A VOLTAGE OF 1 VOLT OR LESS. DOES IT?
     - YES
     - NO

   - PROBE CKT 455 WITH A TEST LIGHT TO 12 VOLTS.
   - TEST LIGHT SHOULD LIGHT. DOES IT?
     - YES
     - NO

     PLUGGED OR LEAKING SENSOR VACUUM HOSE OR FAULTY MAP SENSOR. REFER TO "DIAGNOSTIC AIDS" ON FACING PAGE.

     CKT 432 SHORTED TO VOLTAGE OR SHORTED TO CKT 474 OR FAULTY ECM.

     OPEN CKT 455.
CODE 64
MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR CIRCUIT
(SIGNAL VOLTAGE LOW - HIGH VACUUM)

Circuit Description:
The Manifold Absolute Pressure (MAP) sensor responds to changes in manifold pressure (vacuum). The ECM receives this information as a signal voltage that will vary from about 1 to 1.5 volts at closed throttle (idle) to 4.5 - 4.8 volts at wide open throttle (low vacuum).

If the MAP sensor fails, the ECM will substitute a fixed MAP value and use the Throttle Position Sensor (TPS) to control fuel delivery.

Test Description: Numbers below refer to circled numbers on the diagnostic chart.
1. Code 64 will set if:
   - Engine rpm less than 600.
   - Manifold pressure reading less than 13 kPa.
   - Conditions met for 1 second.
   or
   - Engine rpm greater than 600.
   - Throttle angle over 20%.
   - Manifold pressure less than 13 kPa.
   - Conditions met for 1 second.
2. This test to see if the sensor is at fault for the low voltage, or if there is an ECM or wiring problem.
3. This simulates a high signal voltage to check for an open in CKT 432. If the test light is bright during this test, CKT 432 is probably shorted to ground. If “Scan” reads over 4 volts at this test, CKT 474 can be checked by measuring the voltage at terminal “C” (should be 5 volts).

Diagnostic Aids:

An intermittent open in CKTs 432 or 474 will result in a Code 64.

With the ignition “ON” and the engine “OFF,” the manifold pressure is equal to atmospheric pressure and the signal voltage will be high. This information is used by the ECM as an indication of vehicle altitude.

Comparison of this reading with a known good vehicle with the same sensor is a good way to check accuracy of a “suspect” sensor. Readings should be the same ± .4 volts. Also CHART C-1D can be used to test the MAP sensor. Refer to “Intermittents” in Section “B”

NOTE: Make sure electrical connector remains securely fastened.

- Check all connections.
- Disconnect sensor from bracket and twist sensor by hand (only) to check for intermittent connections. Output changes greater than 1 volt indicates a bad connector or connection. If OK, replace sensor.
- Refer to CHART C-1D, MAP sensor voltage output check for further diagnosis.
CODE 64
MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR CIRCUIT
(SIGNAL VOLTAGE LOW - HIGH VACUUM)

1. IGNITION "OFF" FOR 10 SECONDS.
   START ENGINE AND IMMEDIATELY NOTE MAP
   VALUE ON "SCAN." DOES "SCAN" DISPLAY MAP BELOW .25 VOLT?
   YES
   NO

2. IGNITION "OFF."
   DISCONNECT SENSOR ELECTRICAL CONNECTOR.
   JUMPER HARNESS TERMINALS "B" TO "C."
   IGNITION "ON."
   MAP VOLTAGE SHOULD READ OVER 4.7 VOLTS.
   DOES IT?
   NO
   YES

3. IGNITION "OFF."
   REMOVE JUMPER WIRE.
   PROBE TERMINAL "B" (CKT 432) WITH A
   LIGHT TO 12 VOLTS.
   IGNITION "ON."
   "SCAN" SHOULD READ OVER 4 VOLTS.
   DOES IT?
   YES
   NO

   CKT 474 OPEN OR SHORTED TO GROUND OR
   FAULTY ECM.

   CKT 432 OPEN OR SHORTED TO GROUND OR
   CKT 432 SHORTED TO SENSOR GROUND OR
   FAULTY ECM

CODE 64 IS INTERMITTENT.
IF NO ADDITIONAL CODES WERE STORED, REFER TO "DIAGNOSTIC AIDS" ON FACING PAGE.

FAULTY CONNECTION OR SENSOR.
(REFER TO "DIAGNOSTIC AIDS" ON FACING PAGE.)

3-6-90
75 3158-6E
TO: ALL CHEVROLET DEALERS

This bulletin provides a revised Preliminary Check Procedure and Shift Speed Chart for 1990 HM4L60/700-R4 transmissions. These charts have been updated since publication of the 1990 Service Manuals. Please make reference to these changes in your service manuals.

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GSD 148D Rev. 8/86
## 1990 HYDRA-MATIC 4L60 SHIFT SPEED CHART

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<th>12 MIN THROTTLE</th>
<th>23 MIN THROTTLE</th>
<th>34 MIN THROTTLE</th>
<th>12 W.O.T.</th>
<th>43 COAST DOWN</th>
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**NOTES:**

1. ALL SPEEDS INDICATED ARE IN MILES PER HOUR. CONVERSION TO km/h = MPH × 1.609.
2. SHIFT POINTS WILL VARY SLIGHTLY DUE TO ENGINE LOADS AND VEHICLE OPTIONS.
3. SPEEDS LISTED WITH + EXCEED 65 MPH.
### Preliminary Check Procedure

- Check transmission fluid level
- Check and adjust T.V. cable
- Check outside manual linkage and correct
- Check engine tune
- Install pressure gage
- Connect tachometer to engine
- Check pressure as follows:

**Minimum T.V. Line Pressure Check**
Set the T.V. cable to specification; and with the brakes applied, take the line pressure readings in the ranges and at the engine r.p.m. indicated in the chart below.

**Full T.V. Line Pressure Check**
Full T.V. line pressure readings are obtained by tying or holding the T.V. cable to the full extent of its travel; and with the brakes applied, take the line pressure readings in the ranges and at the engine r.p.m. indicated in the chart below.

*Notice*  Total running time for this combination not to exceed 2 minutes.

*Caution*  Brakes must be applied at all times.

#### 1990 Hydra-Matic 4L60 Transmission Pressures

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<th>Model</th>
<th>Normal Pressure at Minimum T.V.</th>
<th>Normal Pressure at Full T.V.</th>
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<td>1311-1773</td>
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<td><strong>Reverse @ 1000 RPM</strong></td>
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<td>175-226</td>
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<tr>
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<td>183-186</td>
<td>1127-1286</td>
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<tr>
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<td>1127-1286</td>
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<tr>
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<tr>
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<td>183-186</td>
<td>1127-1286</td>
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</table>

Line pressure is basically controlled by pump output and the pressure regulator valve. In addition, line pressure is boosted in Reverse, Second and Lo by the reverse boost valve.

Also, in the Neutral, Drive, Intermediate and Reverse positions of the selector lever, the line pressure should increase with throttle opening because of the T.V. system. The pressure is controlled by the T.V. cable, the throttle lever and bracket assembly and the T.V. link, as well as the control valve assembly.

The main line pressure tap plug is located on the left side of the transmission above the outside manual lever.

*Figure 2*

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90-77-7A
TO: ALL CHEVROLET DEALERS

This bulletin covers revised 1-2 and 3-4 Accumulator Spring Chart. The new chart is applicable to all 1990 THM 700-R4/HYDRA-MATIC 4L60 transmissions. See Figure 1.

Use the following chart to update your 1990 HYDRA-MATIC 4L60 Unit Repair Service Manual Section, page 4L60-50, Figure 110.
<table>
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<th>1990 MODELS</th>
<th>12 ACCUMULATOR SPRING COLOR</th>
<th>34 ACCUMULATOR SPRING COLOR</th>
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</thead>
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<td>ORANGE, LT. GREEN, WHITE OR PLAIN</td>
<td>VIOLET</td>
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<tr>
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<tr>
<td>CCM, CFM, FTB, KSM, LCM, LBM, LDM, LFM, WBM</td>
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<tr>
<td>HCM, MBM, SAM</td>
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<td>RED</td>
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<tr>
<td>SHM, TLM</td>
<td>DK. GREEN</td>
<td>LT. BLUE</td>
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<tr>
<td>FBM, HOM</td>
<td>DK. GREEN</td>
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<td>ORANGE, LT. GREEN, WHITE OR PLAIN</td>
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<tr>
<td>BPM, 18BM</td>
<td>DK. GREEN</td>
<td>ORANGE, LT. GREEN, WHITE OR PLAIN</td>
</tr>
</tbody>
</table>

Figure 1
TO: ALL CHEVROLET DEALERS

This bulletin serves to clarify the labeling of the Packard 32 way connectors used on the GMP4 under dash ECMs.

Currently a common strain relief is used in both the C-D 32 pin and the E-F 32 pin connectors. To properly identify these connectors, the strain reliefs must be removed. Use the lettering on the connector as shown on the attached document.

The colors used at this time for the 32 pin E-F connector are yellow, mint green or orange.

This updates any previous information released concerning identification that indicates any of these colors as being C & D connectors, found in the 6E and 8D Sections of the affected Service Manuals.

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USE THESE LETTERS FOR PROPER IDENTIFICATION

1 STRAIN RELIEF
2 CONNECTOR END

PED

PED

PED

7-20-89
958141-6E