

C. Propane Enrichment Method for All Vehicles Equipped with Model 2700 Carburetors

CAUTION: Block the wheels **before** starting the engine.

NOTE: Remove and reinstall air cleaner when necessary to perform adjustments.

1. Connect a tachometer and bring the engine to normal operating temperature.

NOTE: If the engine has a "Dura Spark I" ignition system (blue coil tower), use a tachometer rated for this type of system.

2. Disconnect the evaporative emission purge hose from air cleaner or remove the evaporative canister purge line from the PCV line "Tee" and cap. Disconnect the crankcase ventilation closure hose from the air cleaner assembly and plug the air cleaner hole.

3. Check engine curb idle speed; if necessary, reset to specification.

NOTE: Even if the vehicle has less than 100 miles of operation, set the speed to the "normal" engine specification and not the "green" engine specification.

- With transmission in neutral, run engine at approximately 2500 rpm for 15 seconds before each speed check. The idle speed must be set to specification with air cleaner assembly installed.

4. Where specified, install (using a "Tee" fitting) a calibrated air leak tool or equivalent into the PCV line.

5. For vehicles equipped with Thermactor systems, reinsert the dump valve vacuum line(s) as follows:

- a. For dump valves with one or two vacuum lines at the side, disconnect and plug the line(s).
- b. For dump valves with one vacuum line at the top, check line to see if it is connected to intake manifold vacuum. If not, remove and plug the line at the dump valve and connect a slave line from the dump valve vacuum fitting to an intake manifold vacuum fitting.

6. Plug gas Tool T75L-9600-A or equivalent into the air cleaner evaporative purge nipple or dust and valve of air cleaner. With the engine idling, slowly open the gas bottle valve until the engine speed reaches a maximum and then begins to drop—note the maximum amount of speed increase. If speed will not drop, check bottle gas supply. If necessary, repeat this operation with a new bottle gas supply.

- a. If speed increase is within specification, proceed to Step 7.

- b. If speed increase is higher than specification: —Enrich the mixture **without propane** by turning the mixture screws clockwise in equal amounts until the rpm increases as necessary (i.e., if the increase was "0" rpm and the desired reset increase is 20 rpm, the mixture screws should be leaned to attain a 20 rpm decrease).

—Repeat Steps 3 and 6.

NOTE: Do not turn the mixture screws more than 4 turns from a lightly seated position.

7. Remove Rotunda tool or equivalent from air cleaner purge nipple or duct and valve of air cleaner and

reinstall all system components removed in Step 2. Also, move "TEE" from the PCV line that was installed in Step 4.

8. Set curb idle speed to specification. If curb idle speed was adjusted in Step 3 or 8, then check the internal fuel bowl vent clearance and adjust as necessary, to specification.

NOTE: If the vehicle has less than 100 miles of operation, set the curb idle speed to the "green" engine specification.

9. Turn off the engine. Disconnect tachometer and make sure that wing nut(s) in the air cleaner is torqued to specification.

SSD-14—IGNITION SYSTEM

To properly diagnose the ignition system the following steps must be taken:

- The E.E.C. Ignition System can be identified by the lack of any distributor diaphragm advance mechanism.

- The spark plug wire sequence for E.E.C. equipped engines can be found on the top of the distributor cap.

- **NOTE:** Because of the unique two-level rotor, the firing order is not the spark plug wire sequence.

CAUTION: Due to the critical nature of E.E.C. rotor registry, the E.E.C. rotor should be removed for replacement reasons **only**.

- For complete E.E.C. ignition system diagnostic procedures—also refer to SSD-25.

- If for any reason any two-piece distributor cap (cap and adaptor) must be removed, the top portion of the cap must be removed first, followed by the rotor and then the bottom portion of the cap (adaptor).

CAUTION: On catalytic converter equipped engines, no spark plug wire should be removed for more than 30 seconds for the coil reserve and rotor-to-cap voltage drop tests combined. Engine rpm should be increased to measurement speed before spark plug wire removal to keep the test time to a minimum.

- If for any reason any high tension wire is disconnected, the interior of the terminal boot must be greased with silicone grease D7AE-19A331-AA or equivalent before reconnection. This should be performed by applying a thin layer of the silicone grease (using a clean small screwdriver) to the boot interior from the terminal to the end of the boot.

- All distributor brass rotor tips have a coating of silicone grease to reduce RFI (radio frequency interference) noise emissions. Do not attempt to remove this silicone coating from the rotor tip or distributor cap electrodes onto which some of the grease may have transferred. As this compound ages it has the appearance of being a contaminant. This condition is normal and causes no functional or performance problem.

- Unless otherwise specified, all high voltage measurements are to be made with only a "clamp on" type high voltage probe connected to the coil to distributor high tension wire.

I. HIGH VOLTAGE PORTION (ALL ENGINE FAMILIES)

- A. Visually inspect all wires, connections and related system components for any abnormal conditions. Repair and/or replace as required.

B. Measure the Ignition System Coil Reserve Voltage. Specification: 28 Kv minimum.

To make this measurement, connect a diagnostic console 36-0036 or equivalent, capable of displaying high voltage and engine rpm readings to the vehicle. Its "clamp on" voltage pickup must be connected to the coil-to-distributor high tension wire. With the engine running at 1000 rpm, observe engine operation and read scope pattern for any abnormal conditions. Note abnormal condition and proceed. With engine running at 1000 rpm, (see Caution in Note 2 and below), remove one spark plug wire from its plug, not allowing the wire to arc to ground and read the highest open circuit voltage indicated on the scope.

CAUTION: For this test, do not remove the following spark plug wires while engine is running: (Except for vehicles equipped with an E.E.C. system)

- No. 1 or No. 8 wire on V-8 engines
- No. 3 or No. 5 wire on I-6 engines
- No. 1 or No. 4 wire on V-6 engines
- No. 1 or No. 3 wire on I-4 engines

If this reading fails, the problem may be in the system module (breakerless distributor), the ignition coil, the primary wiring circuits or in the coil to the distributor high voltage wire. Regardless of the reading, continue with the tests.

- a. Check coil-to-distributor high voltage wire. Specification: 5K Ohms per inch max. Replace if required.
- b. Check primary (low voltage) portion. Repair and/or replace as required.

(1) Step IIA (Dura Spark II)

(2) Step IIB (Dura Spark I)

C. Measure the Distributor Rotor-to-Cap Voltage Drop

Specification: 8 Kv. Max.

To make this measurement connect a diagnostic console 36-0036 or equivalent high voltage probe to the coil to distributor high voltage wire. Remove one spark plug wire from its spark plug and ground the wire to the engine block with an appropriate ground wire connected to the spark plug terminal. Run the engine at idle and do not allow a spark gap to occur between ground and the spark plug wire.

If this test fails, the problem is in the distributor rotor or the distributor cap, or both. First, replace the rotor according to Appendix "B", if the vehicle is equipped with an EEC system and rerun the test. If the test again fails, replace the distributor cap.

Important for grease requirements:

- A. When replacing the rotor, the brass electrode tip (non-EEC systems) or the two wide blade brass rotor tips (EEC systems) must be coated approximately 1/16 inch thick on all sides (outboard of the plastic) with D7AZ-19A331-AA silicone grease or equivalent (Dow 111 or G.E. G-627 compound).

- B. For EEC systems **only**, when replacing the distributor cap, the brass "cross" surfaces shown in Fig. 9 must be coated with D7AZ-19A331-AA silicone grease or equivalent (Dow 111 or G.E. G-627 compound).

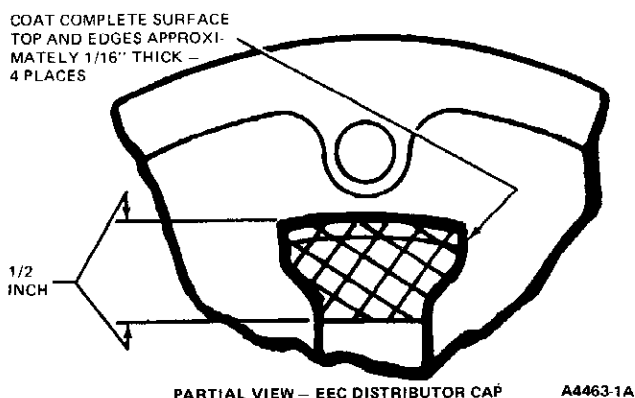


FIG. 9 Partial View—EEC Distributor Cap

D. Measure Spark Plug Required Voltage

Specification: 8-20 Kv.

To make this measurement connect a diagnostic console 36-0036 or equivalent high voltage probe to the coil to distributor high voltage wire. Momentarily bring engine to approximately 2000 rpm, and read the highest spark plug high voltage requirement for each cylinder.

1. If the required voltage fails low, remove the probe from the coil wire and connect it to each spark plug wire to determine which spark plug is low.

NOTE: When measuring required voltage on individual plug wires, the minimum specification is reduced to **6 Kv.**

Remove the spark plug from any cylinder having a required voltage less than approximately **6 Kv.** and/or significantly lower voltage than other cylinders during acceleration and inspect for closed gap, bridged gap fouled insulator nose, or cracked ceramic. Repair or replace as required.

2. If required voltage is more than approximately **20 Kv.** and/or significantly (50 percent) higher than other cylinders, use the same procedure as shown above (1) to locate the problem cylinder. Check both the spark plug and the high voltage spark plug wire. Remove spark plug and inspect for excessively worn or burnt electrodes, or high resistance between terminal and center electrodes or high resistance between terminal and center electrode. Repair or replace as required.

E. Spark Plug Wires

Specification: 5K Ohms Per Inch Max.

To properly inspect the spark plug wire harness, first remove all wires from the spark plugs by twisting the spark plug boot carefully to loosen its seal on the plug insulator. Remove the wire by pulling on the plug boot. Disconnect the wire separators from the valve covers, and remove the distributor cap from the distributor—leaving the

plug wires connected to the cap. Do not remove the spark plug wires from the cap except for replacement. Using an ohmmeter, check the resistance of each wire by connecting one meter lead to the spark plug terminal (use adaptor if available) and the other lead to the distributor cap insert. Replace any wires that are not within specification. Visually inspect the spark plug boots for possible damage due to heat or handling. Replace as required.

II. PRIMARY (LOW VOLTAGE) PORTION

A. Dura Spark I (Limited California Application Only)—See Fig. 10

*SUGGESTIONS FOR INTERMITTENT OPERATION (DURA SPARK I AND DURA SPARK II APPLICATIONS)

If ignition system becomes operative in the course of performing these procedures and you have not made a repair, it is likely an intermittent connection or an intermittent ignition component has become functional. The following suggestions are offered:

Perform First: With the engine running, attempt to recreate the problem by wiggling the wires at the coil, module, distributor and other harness connectors. Start first with the connections you might have already disturbed. Also check the ground connection in the distributor. Disconnecting and reconnecting connectors may also be helpful.

CAUTION: DO NOT CLEAN GREASE FROM CONNECTORS as it is required to prevent terminal corrosion.

Perform Second: Intermittent Component Testing.

Pick-Up Coil: With the engine off, heat the stator pick-up coil by placing a 250 watt heat lamp approximately 1" to 2" from its top surface. Apply heat for 5 to 10 minutes while monitoring pick-up coil continuity between the parallel blades of the disconnected distributor connector. The resistance should be 400-1000 ohms. Tapping with a screwdriver handle may also be helpful.

Ignition Module: With engine running, heat module by placing a 250 watt heat lamp approximately 1" to 2" from the top surfaces of the module. Tapping may also be helpful.

CAUTION: THE MODULE TEMPERATURE SHOULD NOT EXCEED 212 DEGREES F (BOILING). AFTER THE FIRST 10 MINUTES OF HEATING, CHECK THE TEMPERATURE BY APPLYING A FEW DROPS OF WATER TO THE MODULE HOUSING. REPEAT THE CHECK EVERY TWO MINUTES UNTIL THE WATER DROPLETS BOIL. AVOID TAPPING THE MODULE TO THE EXTENT THAT THE HOUSING IS DISTORTED.

If this procedure results in ignition malfunction, substitute (do not install) a known good module. If the malfunction is corrected by the substitution, **VALIDATE THAT THE ORIGINAL MODULE IS MALFUNCTIONING BY RECONNECTING IT TO THE**

VEHICLE. A functional check of the original and known good module can quickly be accomplished by using the "RUN MODE TEST".

*SUGGESTIONS FOR INTERMITTENT OPERATION (EEC—DURA SPARK II APPLICATIONS ONLY)

If ignition system becomes operative in the course of performing these procedures and you have not made a repair, it is likely an intermittent connection or an intermittent ignition component has become functional. The following suggestions are offered:

Perform First: With the engine running, attempt to recreate the problem by wiggling the wires at the coil, module and other harness connectors. Start first with the connections you might have already disturbed. Disconnecting and reconnecting connectors may also be helpful.

CAUTION: DO NOT CLEAN GREASE FROM CONNECTORS as it is required to prevent terminal corrosion.

Perform Second: Intermittent Component Testing.

Ignition Module: With engine running, heat module by placing a 250 watt heat lamp approximately 1" to 2" from the top surface of the module. Tapping may also be helpful.

CAUTION: THE MODULE TEMPERATURE SHOULD NOT EXCEED 212 DEGREES F (BOILING). AFTER THE FIRST 10 MINUTES OF HEATING, CHECK THE TEMPERATURE BY APPLYING A FEW DROPS OF WATER TO THE MODULE HOUSING. REPEAT THE CHECK EVERY TWO MINUTES UNTIL THE WATER DROPLETS BOIL. AVOID TAPPING THE MODULE TO THE EXTENT THAT THE HOUSING IS DISTORTED.

If the procedure results in ignition malfunction, substitute (do not install) a known good module. If the malfunction is corrected by the substitution, **VALIDATE THAT THE ORIGINAL MODULE IS MALFUNCTIONING BY RECONNECTING IT TO THE VEHICLE.** A functional check of the original and known good module can quickly be accomplished by using the "RUN MODE TEST".

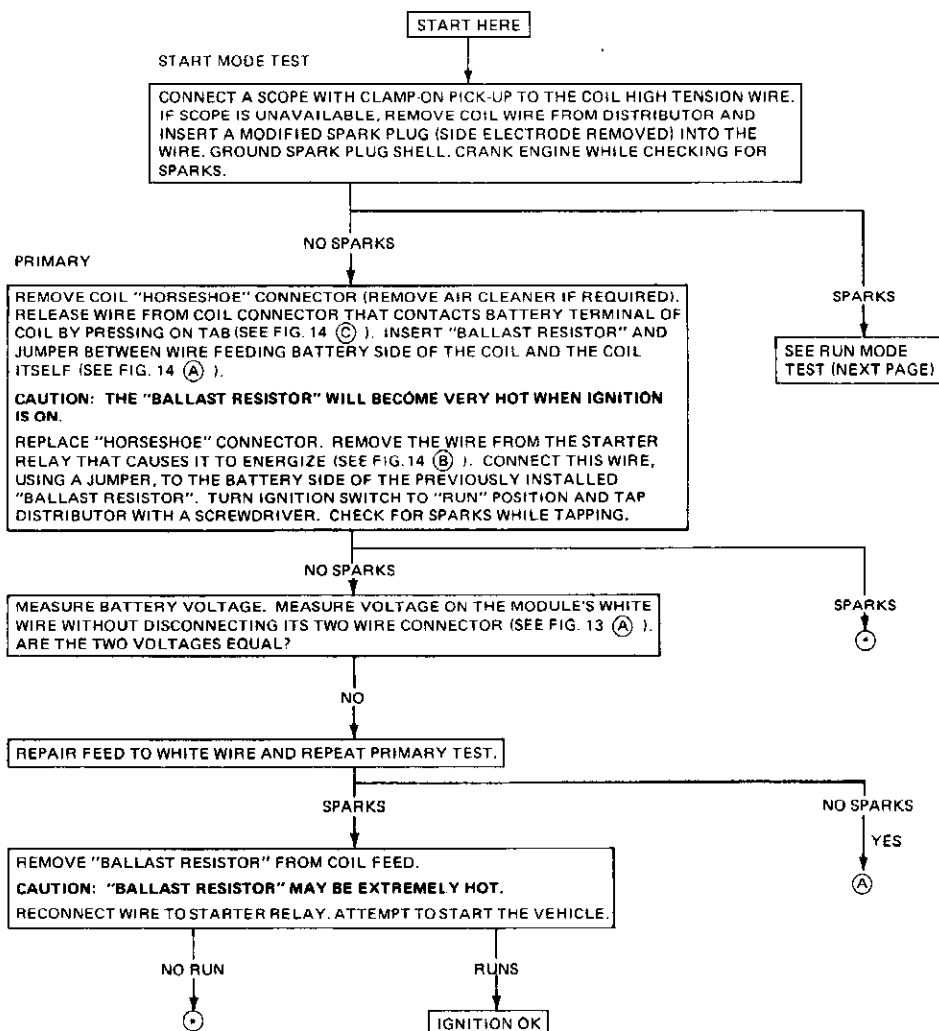
APPENDIX "A"

(All Ignition Systems, Except the EEC System)

NOTE: See SSD-25 for complete diagnostic procedures for the EEC System.

An engine that idles smoothly but becomes rough when accelerated (1000-2000 rpm) can have crossed orange and purple primary ignition wires in the engine harness between the distributor and the module. When this condition exists, the initial timing marks can be properly aligned but the distributor will be as much as 22 degrees from its normal position.

1. With the ignition key off, rotate the engine to initial timing mark firing point.
2. Remove the distributor cap.
 - a. If one of the "spokes" of the armature is opposite the pole of the stator (Magnetic pick-up coil), the ignition primary circuit is OK. See Fig. 22.



• SUGGESTIONS

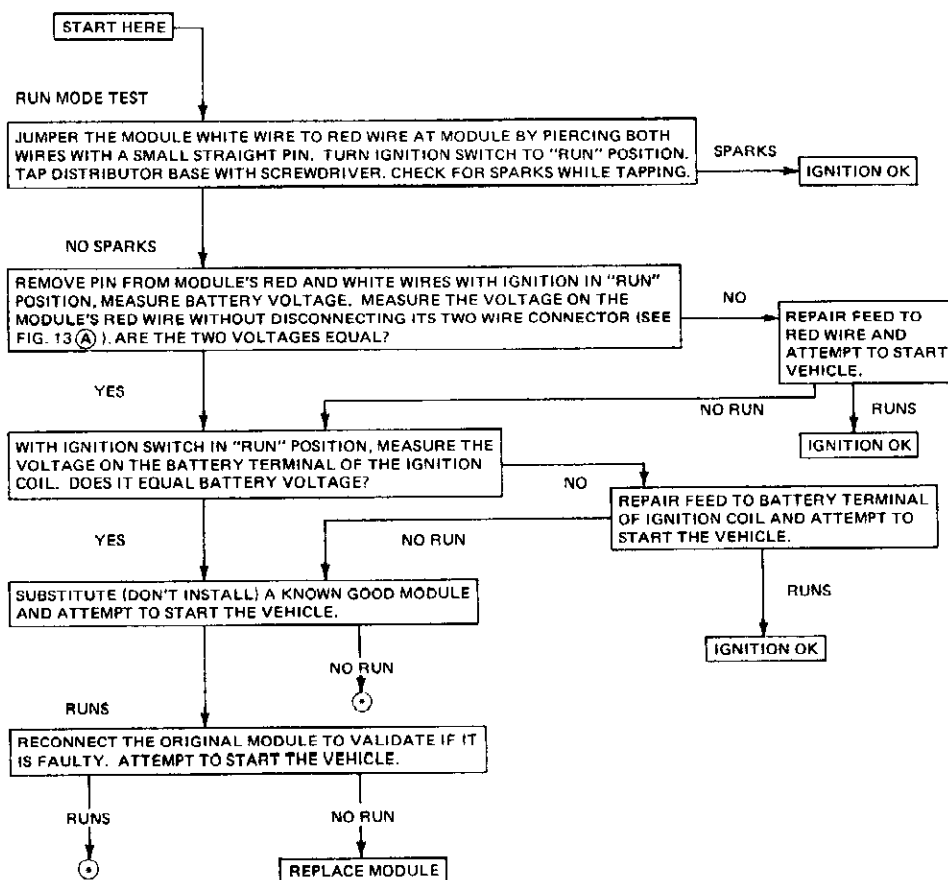
- REPEAT PROCEDURE (RETURN TO RUN MODE TEST).
- SEE SUGGESTIONS FOR INTERMITTENT OPERATION

IMPORTANT

- WHEN REINSTALLING COIL WIRE, COAT THE INSIDE OF THE BOOT WITH SILICONE GREASE (D7AZ-19A331-A OR EQUIVALENT) USING A SMALL, CLEAN SCREWDRIVER BLADE.

(A) — CONTINUE WITH DIAGNOSIS IN FIG. 12.

FIG. 10 Low-Voltage Diagnosis—Dura-Spark I (California)



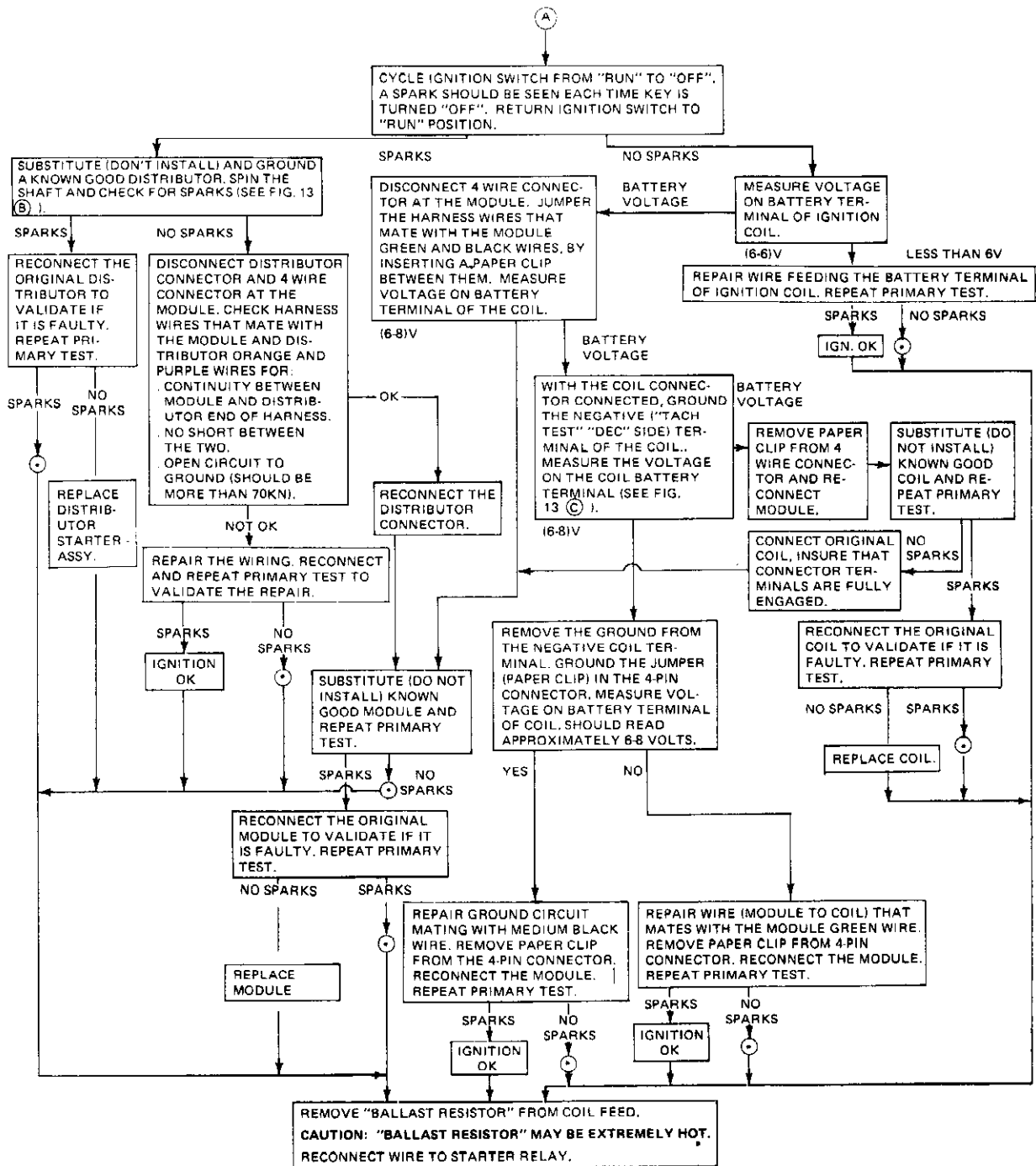
• SUGGESTIONS

- REPEAT PROCEDURE (RETURN TO RUN MODE TEST).
- SEE SUGGESTIONS FOR INTERMITTENT OPERATION.

IMPORTANT

- WHEN REINSTALLING COIL WIRE, COAT THE INSIDE OF BOOT WITH SILICONE GREASE (D7AZ-19A331-A OR EQUIVALENT) USING A SMALL, CLEAN SCREWDRIVER BLADE.

FIG. 11 Low-Voltage Diagnosis—Dura Spark I (California)—Cont'd



Ⓐ SUGGESTIONS

- REPEAT PROCEDURE (RETURN TO RUN MODE TEST)
- SEE SUGGESTIONS FOR INTERMITTENT OPERATION.

IMPORTANT

- WHEN REINSTALLING COIL WIRE, COAT THE INSIDE OF THE BOOT WITH SILICONE GREASE (D7AZ-19A331-A OR EQUIVALENT) USING A SMALL, CLEAN SCREWDRIVER BLADE.

FIG. 12 Low-Voltage Diagnosis—Dura Spark I (California)—Cont'd

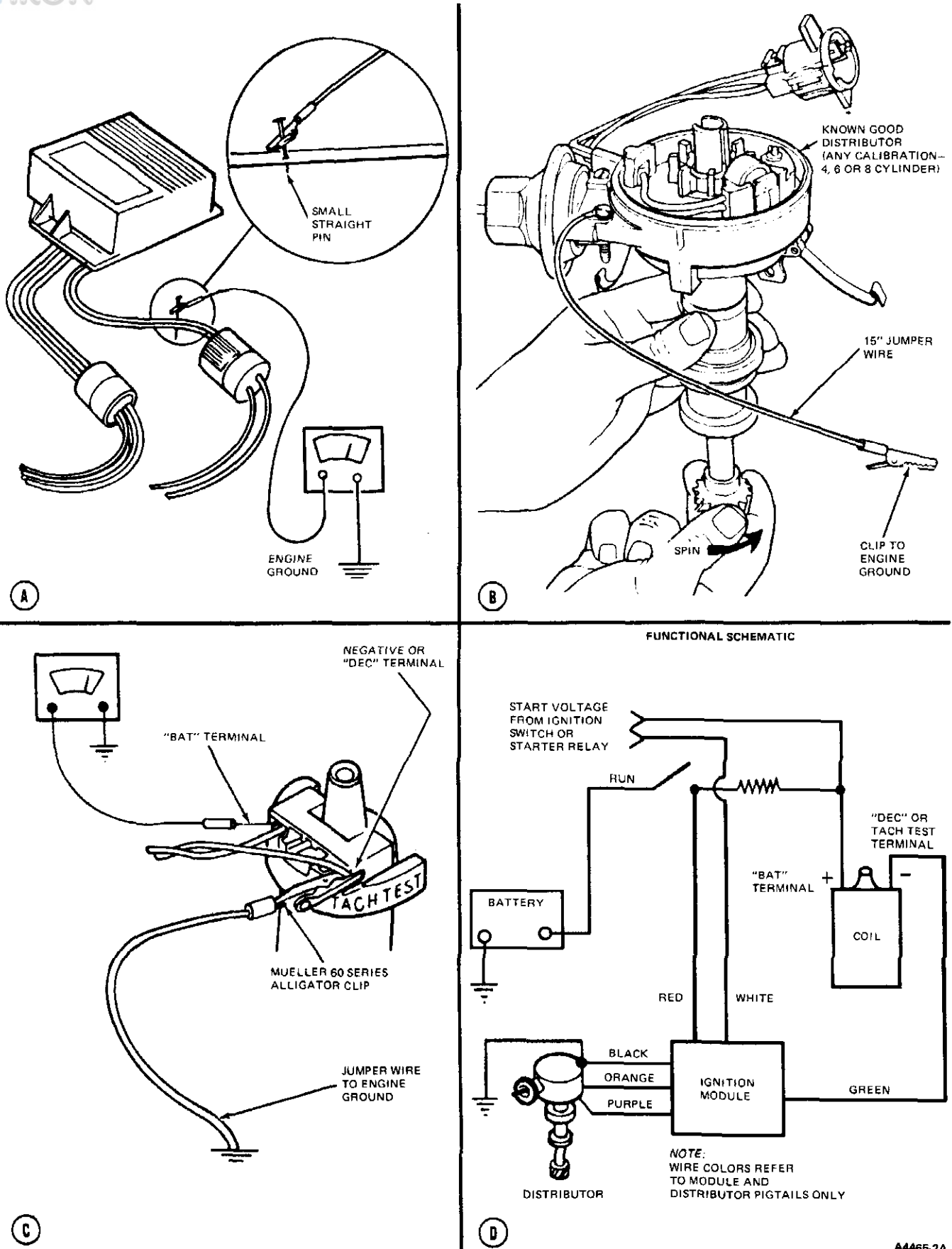


FIG. 13 Dura Spark I Test Connections

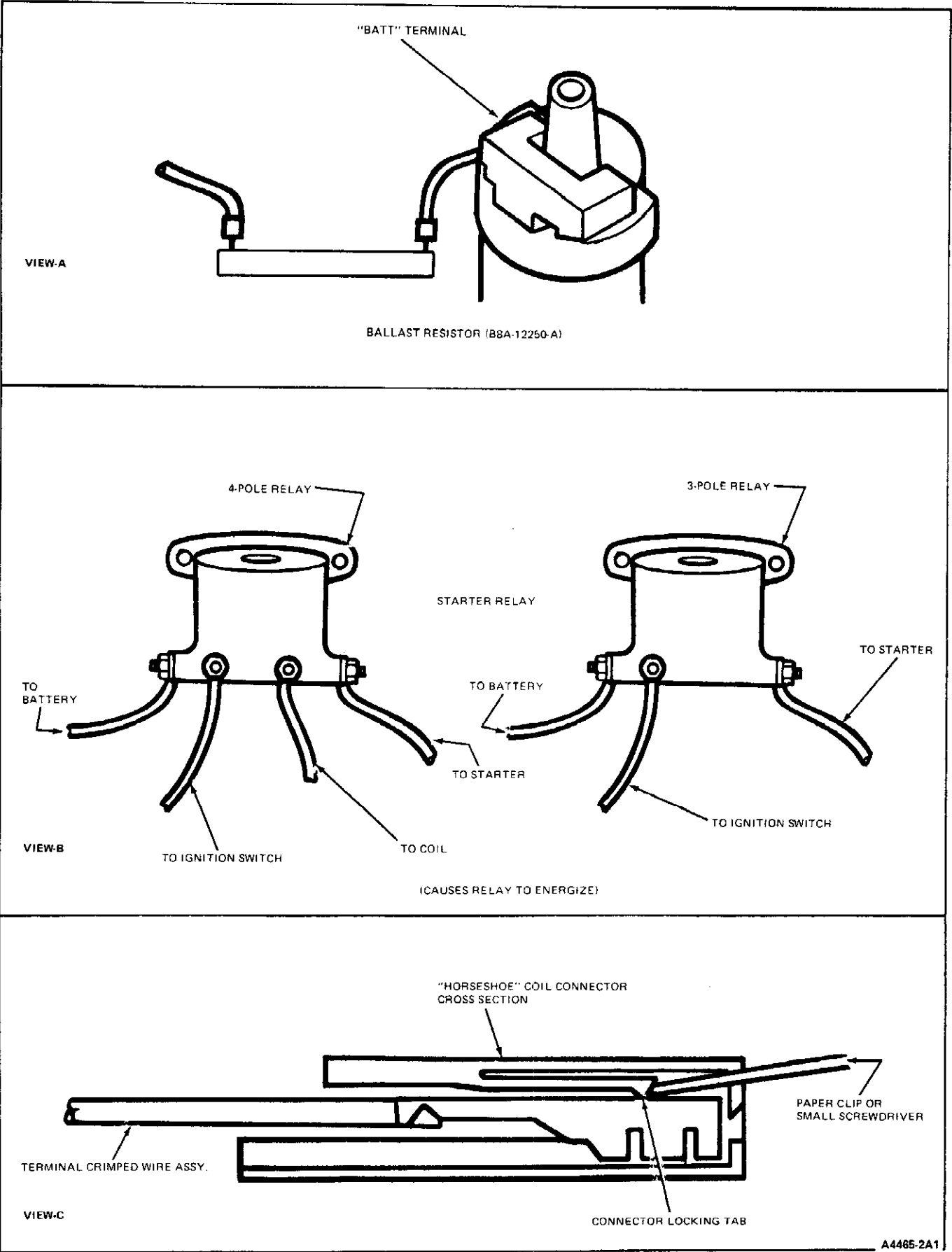
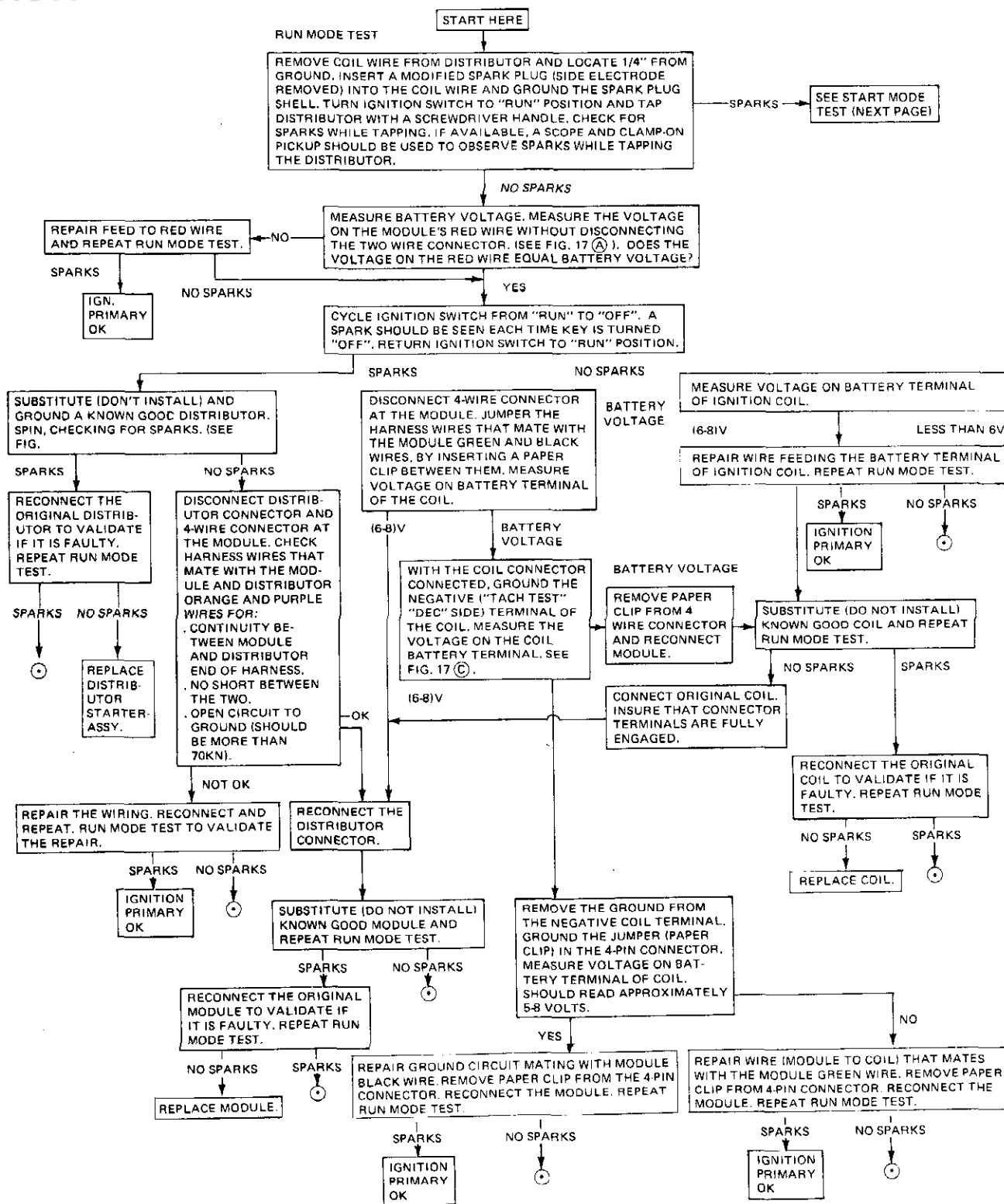


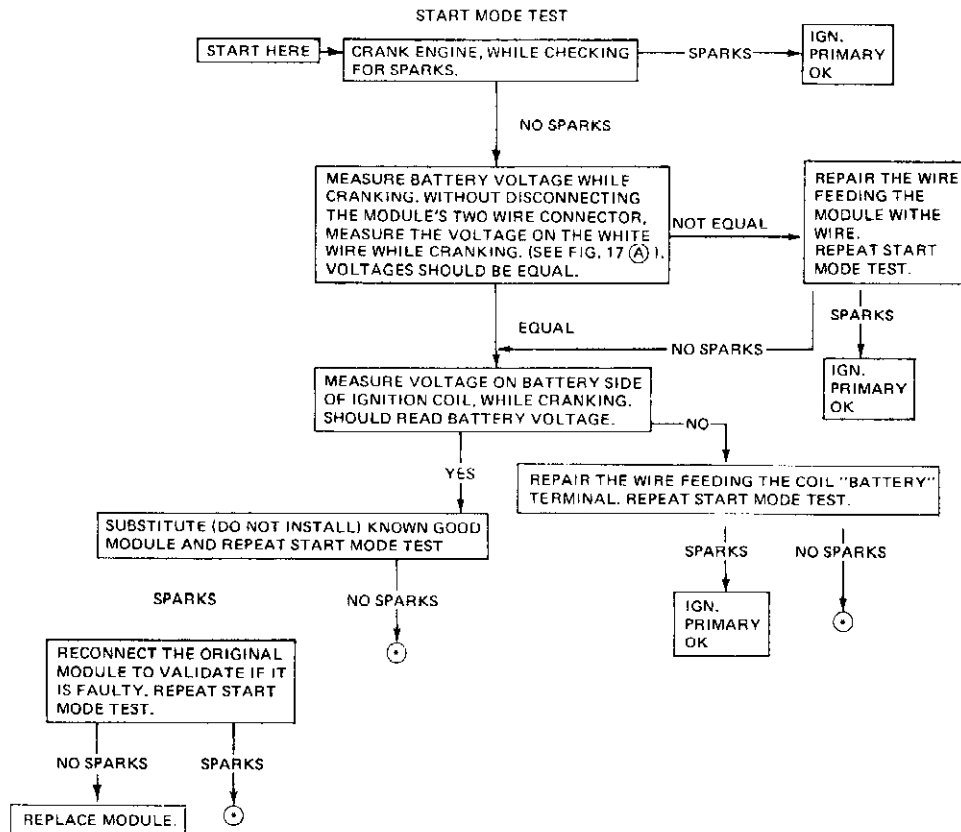
FIG. 14 Dura Spark I Test Connections (Cont'd)



⊙ SUGGESTIONS
 . REPEAT PROCEDURE (RETURN TO RUN MODE TEST).
 . SEE SUGGESTIONS FOR INTERMITTENT OPERATION.

IMPORTANT
 WHEN REINSTALLING COIL WIRE, COAT THE INSIDE OF THE BOOT WITH SILICONE GREASE (D7AZ-19A331-A OR EQUIVALENT) USING A SMALL, CLEAN SCREWDRIVER BLADE.

FIG. 15 Low Voltage Diagnosis—Dura Spark II



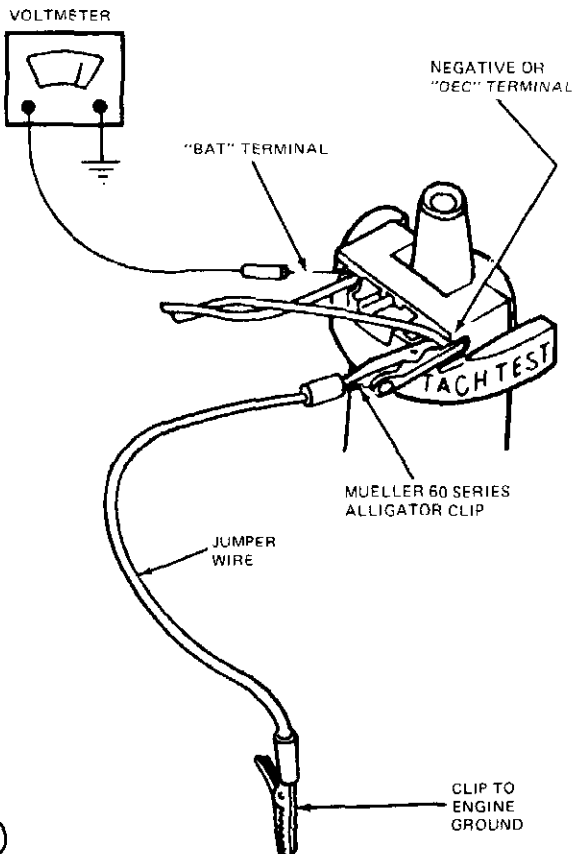
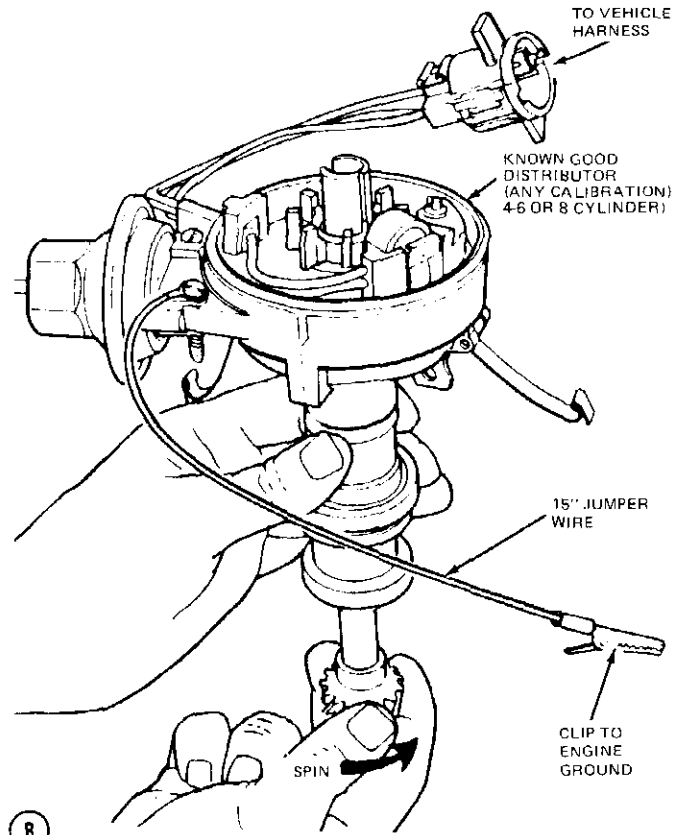
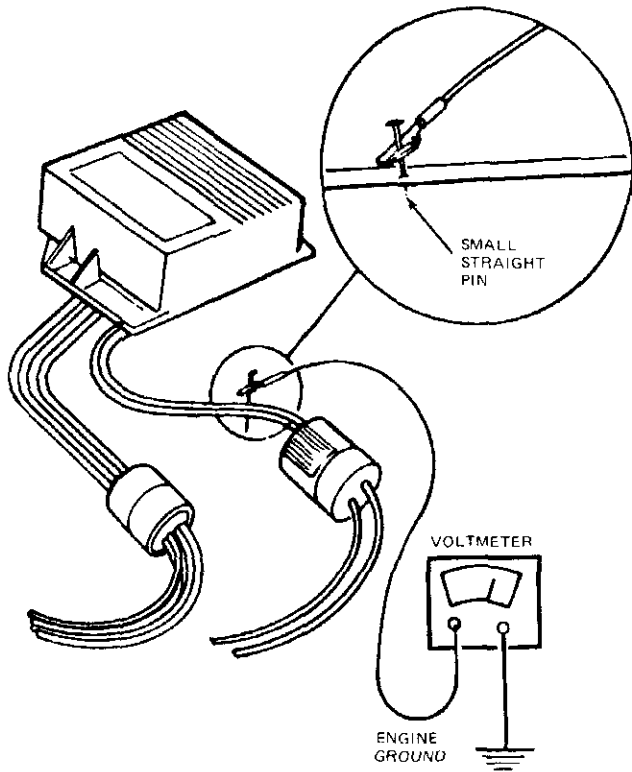
• SUGGESTIONS

- REPEAT PROCEDURE (RETURN TO RUN MODE TEST).
- SEE SUGGESTIONS FOR INTERMITTENT OPERATION.

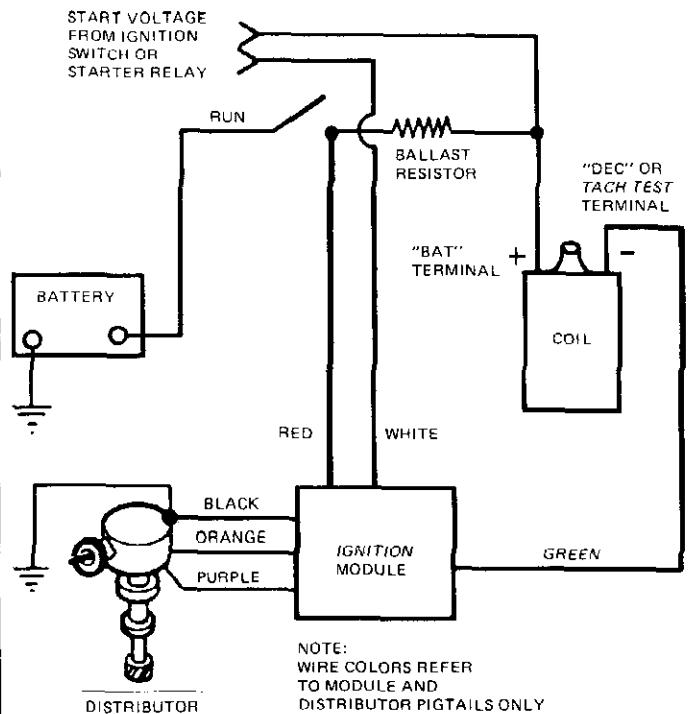
IMPORTANT

- WHEN REINSTALLING COIL WIRE, COAT THE INSIDE OF THE BOOT WITH SILICONE GREASE (D7AZ-19A331-A OR EQUIVALENT) USING A SMALL, CLEAN SCREWDRIVER BLADE.

FIG. 16 Low Voltage Diagnosis—Dura Spark II (Cont'd)

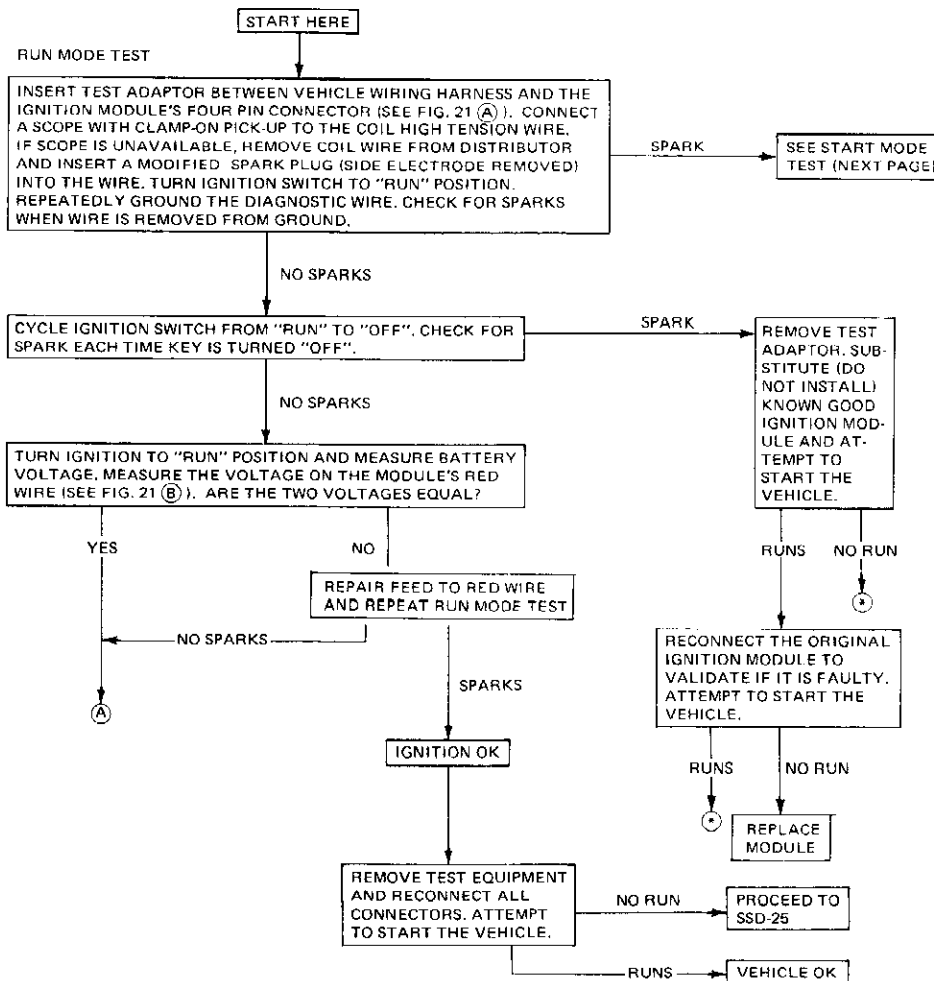


FUNCTIONAL SCHEMATIC



NOTE:
WIRE COLORS REFER
TO MODULE AND
DISTRIBUTOR PIGTAILS ONLY

FIG. 17 Dura Spark II Test Connections



• SUGGESTIONS

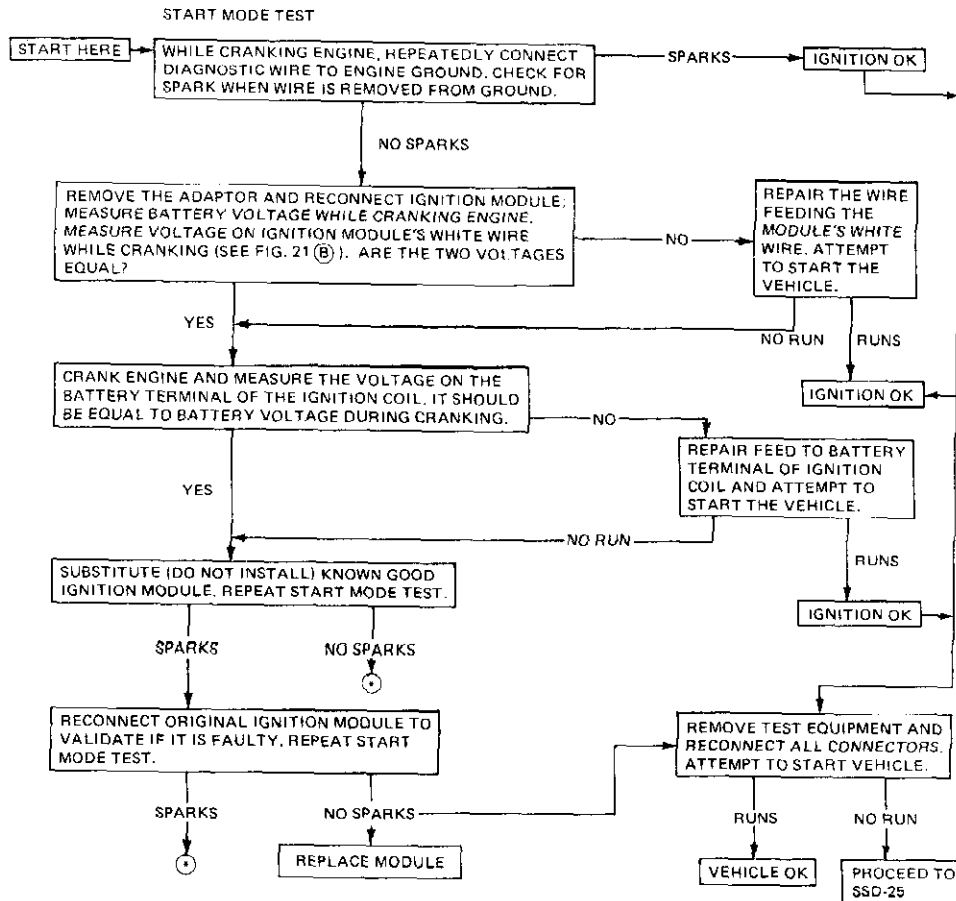
- REPEAT PROCEDURE (RETURN TO RUN MODE TEST)
- SEE SUGGESTIONS FOR INTERMITTENT OPERATION.

IMPORTANT

- WHEN REINSTALLING COIL WIRE, COAT THE INSIDE OF THE BOOT WITH SILICONE GREASE (D7AZ-19A331-A OR EQUIVALENT) USING A SMALL, CLEAN SCREWDRIVER BLADE.

(A) CONTINUE WITH PROCEDURE IN FIGURE 20.

FIG. 18 Low Voltage (Primary) Diagnosis—EEC Dura Spark II



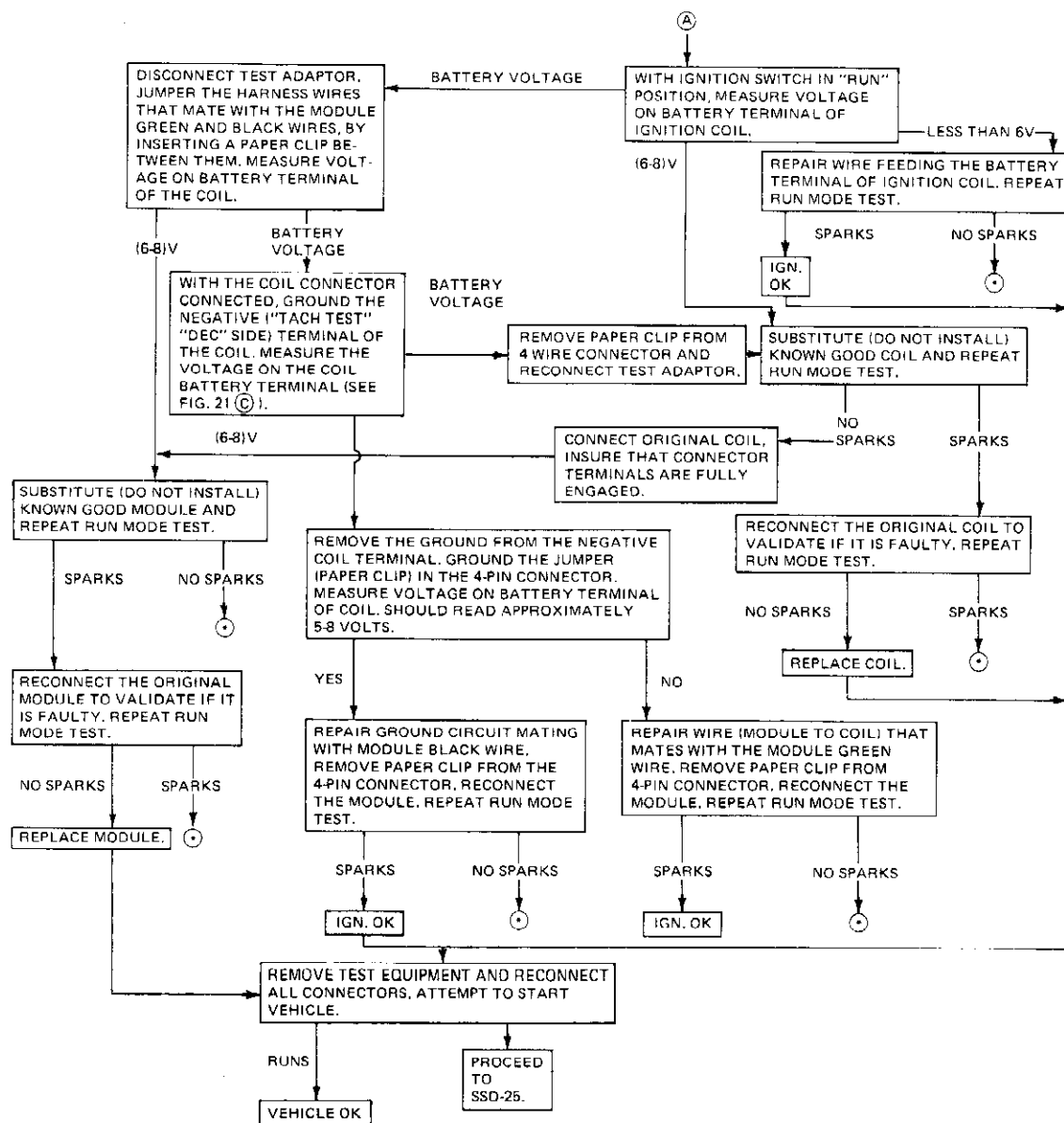
⦿ SUGGESTIONS

- REPEAT PROCEDURE (RETURN TO RUN MODE TEST)
- SEE SUGGESTIONS FOR INTERMITTENT OPERATION

IMPORTANT:

WHEN REINSTALLING COIL WIRE, COAT THE INSIDE OF THE BOOT WITH SILICONE GREASE (D7AZ-19A331-A OR EQUIVALENT) USING A SMALL, CLEAN SCREWDRIVER BLADE.

FIG. 19 Low Voltage (Primary) Diagnosis—EEC Dura Spark II (Cont'd)



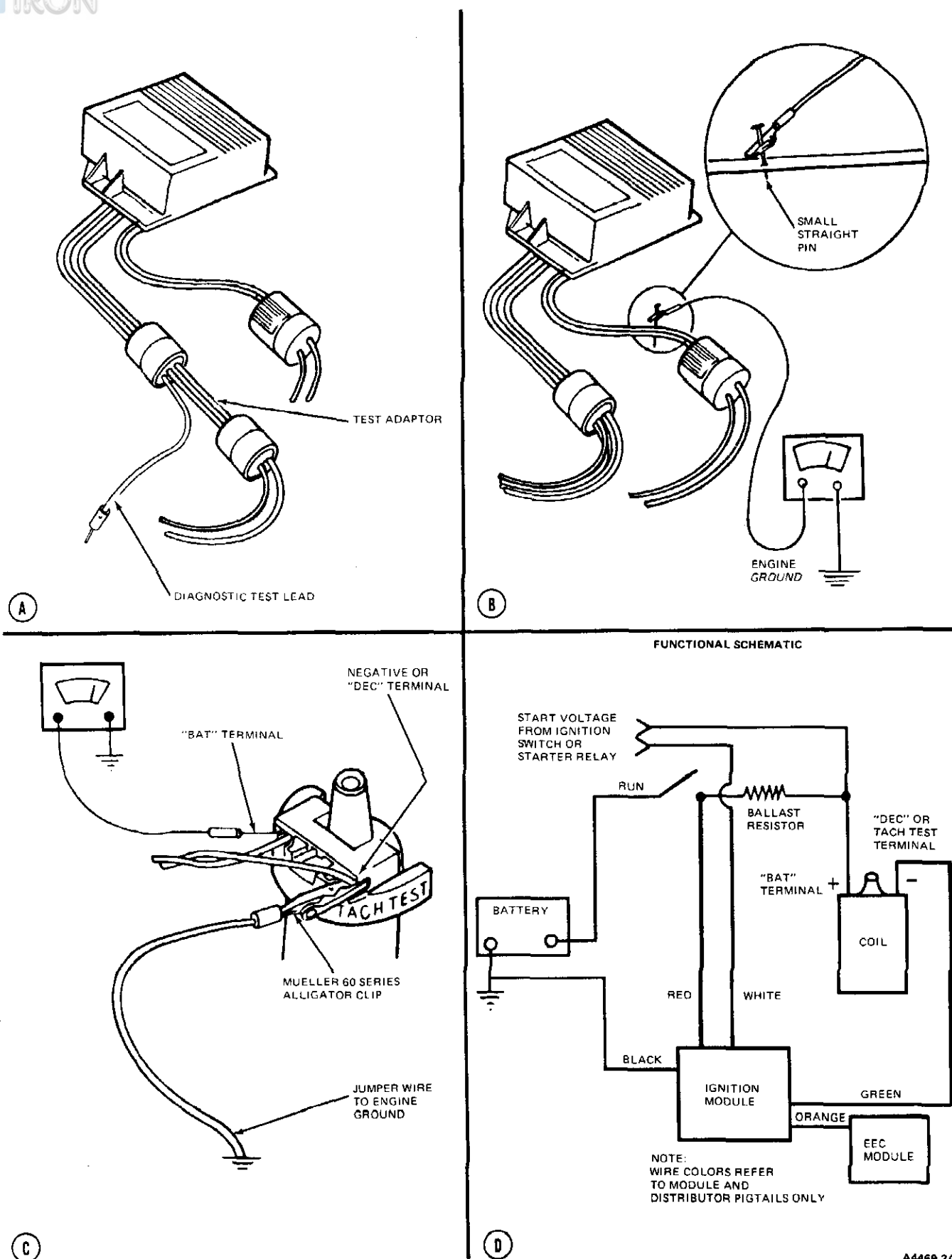
⊙ SUGGESTIONS

- REPEAT PROCEDURE (RETURN TO RUN MODE TEST)
- SEE SUGGESTIONS FOR INTERMITTENT OPERATION

IMPORTANT

- WHEN REINSTALLING COIL WIRE, COAT THE INSIDE OF THE BOOT WITH SILICONE GREASE (D7AZ-19A331-A OR EQUIVALENT) USING A SMALL, CLEAN SCREWDRIVER BLADE.

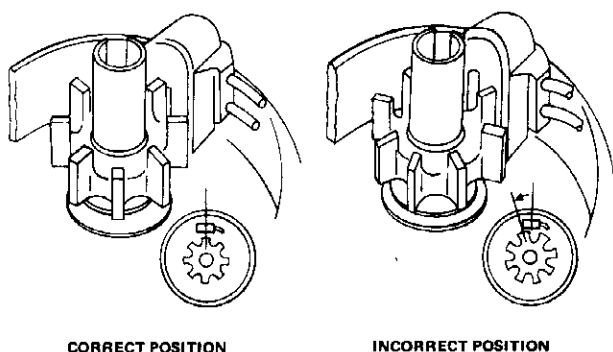
FIG. 20 Low Voltage (Primary) Diagnosis—EEC Dura Spark II (Cont'd)



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FIG. 21 EEC System Test Connections

- b. If the stator pole is between two "spokes", the primary wires are probably crossed see Fig. 22. If the position is incorrect, proceed to Step 3.
3. Visually check the color continuity of both the orange and purple wires through the distributor to engine harness connector (A) and through the module to engine harness connector (B) before separating the connectors. (Fig. 21)
4. Disconnect the two connectors and check continuity of both the orange and the purple wires through the engine harness.
 - a. If color and electrical continuity in 3 and 4 are good, the problem is not in the orange and purple wire harness. Substitute the distributor stator assembly and/or the ignition module with known good components to check for crossed wires in these components.
 - b. If not, cut open the engine harness, cut, cross, splice, solder and tape wires corresponding to the orange and purple wires of the distributor and retape the harness.
5. Return the distributor to the normal position and/or reset initial timing per SSD-15 Step A, if required, and verify effectiveness of repair.



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FIG. 22 Checking Initial Timing Firing Point

APPENDIX "B"

E.E.C. System Rotor and Distributor Replacement Procedure

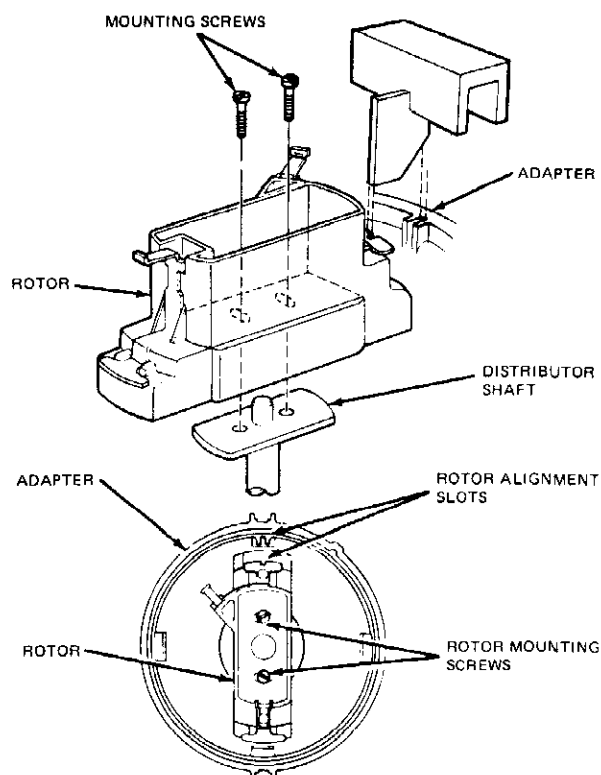
Rotor Replacement and Alignment Procedure
(Refer To Fig. 23)

1. Remove the distributor cap by loosening the two spring clips holding the cap to the distributor adapter.
2. Rotate the crankshaft sufficiently to align the upper blade (blade with slot) with the locating slot in the distributor adapter so that the rotor alignment tool (T78P-12200-A or equivalent) will drop into place. At the same time the zero mark on the damper (No. 1 Cyl. TDC) should align with the pointer on the front cover. If the damper does not align with the pointer by this procedure or if the rotor or adapter is damaged and alignment is not possible, then position the crankshaft at the No. 1 cylinder TDC position by aligning the zero mark on the damper with the pointer on the front cover.

3. Remove the rotor alignment tool (if used in previous step) and remove the two screws securing the rotor to the distributor shaft. Remove the rotor.

Caution: Do not rotate the crankshaft once the rotor has been removed.

4. Place the new rotor on the distributor shaft with the slot in the upper blade pointing to the locating notch in the distributor adapter. Install, but do not tighten, both rotor mounting screws.
5. Position the rotor alignment tool (T78P-12200-A or equivalent) in the adapter so that the tang on the underside of the tool simultaneously engages the locating notch in the distributor adapter and the slot in the rotor.
6. Tighten both rotor mounting screws to 15-20 in.-lbs.



A4470-1A

FIG. 23 Rotor Alignment—EEC System

7. Remove the rotor alignment tool and reinstall the distributor cap (top portion). Seat both cap to adapter spring clips.

Distributor Removal and Replacement Procedure

1. Remove the top portion of the distributor cap by unfastening the two spring clips holding the distributor cap to the adapter.
2. Rotate the crankshaft sufficiently to align the upper blade (blade with slot) with the locating slot in the distributor adapter so that the rotor alignment tool (T78P-12200-A or equivalent) will drop into place. At the same time the zero mark on the damper (No. 1 Cyl. TDC) should align with the pointer on the front cover. If the damper does not align with the pointer by this procedure or if

the rotor or adapter is damaged and alignment is not possible, then position the crankshaft at the No. 1 cylinder TDC position by aligning the zero mark on the damper with the pointer on the front cover.

From this point on do not rotate the crankshaft.

3. Loosen and remove the distributor clamp and retaining bolt.
4. Remove the distributor assembly from the engine block, noting the position of the rotor blade with respect to the distributor base when the cam and distributor gears are felt to disengage.
5. Position the replacement distributor in the block so that when fully seated the following conditions are met simultaneously:
(It will be helpful at this point to position the rotor with respect to the base at the same location as noted in Step 4.)
 - a) Align the slot on the distributor base hold down flange with the corresponding clamp bolt hole in the block.
 - b) Approximately align the slot in the upper blade of the rotor with the slot in the adaptor. If alignment is not possible within rotor adjustment range, raise the distributor out of the block sufficiently to disengage the cam gear and rotate the distributor shaft slightly to allow the next tooth to engage. Repeat this procedure until both conditions a and b are met.
6. Install the distributor to block clamp and bolt. Torque the bolt to 15-18 ft.-lbs.
7. Position the rotor alignment tool in the adapter so that the tang on the underside of the tool simultaneously engages the locating notch in the distributor adapter and the slot in the rotor.
8. Tighten both rotor mounting screws to 15-20 in.-lbs.
9. Remove the rotor alignment tool and reinstall the distributor cap (top portion). Seat both cap to adapter spring clips.

SSD-15—IGNITION TIMING

Application: All Engines Except Those Equipped with an EEC System

If for any reason any "Dura Spark" two-piece distributor cap (cap and adaptor) must be removed, the top portion of the cap must be removed first, followed by the rotor and then the bottom portion of the cap.

If for any reason any "Dura Spark" high tension wire is disconnected, the interior of the terminal boot must be greased with silicone grease D7AE-19A331-AA or equivalent before reconnection. This should be performed by applying a thin layer of the silicone grease (using a clean small screwdriver) to the boot interior from the terminal to the end of the boot. After adjusting the initial timing, the idle speeds should be checked and, if necessary, readjusted.

A. BASIC TIMING

Applicability: All Engines

1. Clean the surface of the front damper and place a white mark on the proper degree line on the damper and pointer according to specification.
2. Disconnect the vacuum line(s) at the distributor and plug.
3. For vehicles equipped with dual mode timing ignition module (-12A244-) using either the ignition barometric pressure switch assembly or distributor modulator valve switch, disconnect the 3 pin switch assembly connector from the dual mode timing ignition module (Fig. 24).
4. Connect timing light 27-0001 or equivalent to the No. 1 spark plug wire.

CAUTION: For the "Dura Spark I" ignition system, only clamp-on type timing devices, which have an inductive pickup, may be used.

5. Connect a tach-dwell meter 02-0362 or equivalent. Start the engine and warm up. Set timing idle speed to specification.

CAUTION: For the "Dura Spark I" ignition system be sure to use a tachometer rated for this type of ignition system.

6. Check engine initial timing. If within ± 2 degrees of the specification, do not reset.

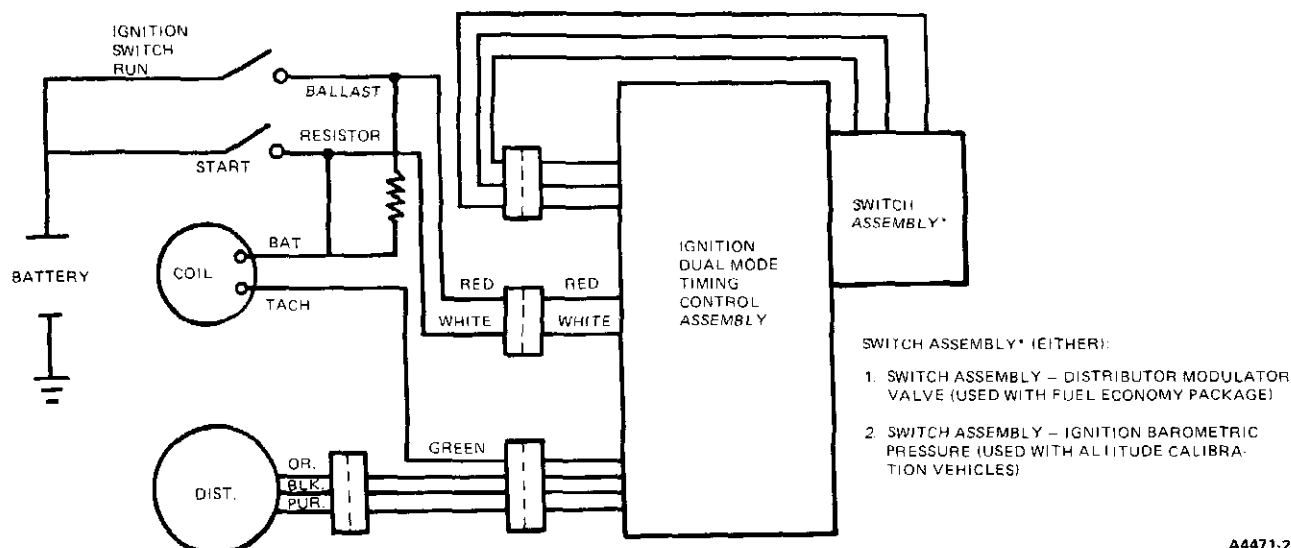


FIG. 24 Dual Mode Timing Ignition Module

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7. If more than ± 2 degrees, loosen the distributor hold-down bolt and adjust initial timing to specification by rotating the distributor against rotor rotation to advance the timing, or with rotor rotation to retard the timing. When the white mark (Step 1) is directly in line with the pointer, ignition timing is correct. Tighten hold-down bolt to specification. Recheck timing after hold-down bolt has been tightened.
8. For vehicles equipped with a dual mode timing ignition module, reconnect the 3 pin switch assembly connector to the module and check its function as follows:

a) Vacuum Switch Applications:

- Disconnect vacuum line to the switch and using an external vacuum source, apply vacuum to the switch and compare basic timing to the requirements below:

Applied Vacuum	Basic Timing
Greater than 10 in Hg	Per Specification
Less than 6 in Hg or 0	Per Specification less 3-6°

b) Barometric Pressure Switch Applications:

- Compare basic timing to the requirements below:

Elevation	Basic Timing
Below 2400 ft	Per Specification less 3-6°
2400 ft to 4300 ft	Per Specification or Per Specification less 3-6°
Over 4300 ft	Per Specification

If the requirements are not met, see Fig. 25.

B. Centrifugal Advance

1. Check centrifugal advance by accelerating engine (in neutral) to 2500 rpm. If ignition timing advance is noted during acceleration, the centrifugal advance mechanism is functional. If not, remove distributor and replace.

C. Total Advance

1. Install a vacuum gauge in the vacuum line from the carburetor source to the vacuum advance diaphragm (outer diaphragm on dual diaphragm

distributors). Increase engine speed to 2500 rpm to verify available vacuum. If no vacuum is available within 60 seconds, vacuum system is at fault, perform SSD-3. If a vacuum is available, perform Step C-2.

2. Install distributor vacuum line (without spark delay valves) to outer diaphragm (on dual diaphragm distributor). Accelerate engine to 2500 rpm. Total advance should now be greater than in Part "B" if advance mechanism is functional. If not, replace vacuum advance components as required.

D. Vacuum Retard (Dual Diaphragm Distributor)

1. Install vacuum gauge in vacuum line from the intake manifold source to the vacuum retard diaphragm (inner diaphragm on dual diaphragm distributors). With the engine at idle verify available vacuum. If vacuum is not available, vacuum system is at fault. Correct as required. If vacuum is available, perform Step D-2.
2. Remove the vacuum gauge and reinstall the vacuum line to the retard diaphragm (inner diaphragm on dual diaphragm distributors). Ignition timing should indicate retard. If no retard is indicated, replace vacuum retard components as required.

SSD-16—FUEL BOWL VENT CLEARANCE

I. Model 2150 Carburetors

A. Mechanical Bowl Vent (if so equipped)

1. Inspect the valve and linkage for damage, leaks and/or improper connections.
2. Check for plugged bowl vent tube by connecting a vacuum source to the bowl vent tube. If a vacuum is maintained the tube is plugged. Clean and repair and/or replace as required.
3. If necessary, bring engine to normal operating temperature.
4. Check TSP-off speed (for 2.8L engine which does not have a solenoid, check curb idle speed) to specifications. Adjust as required.

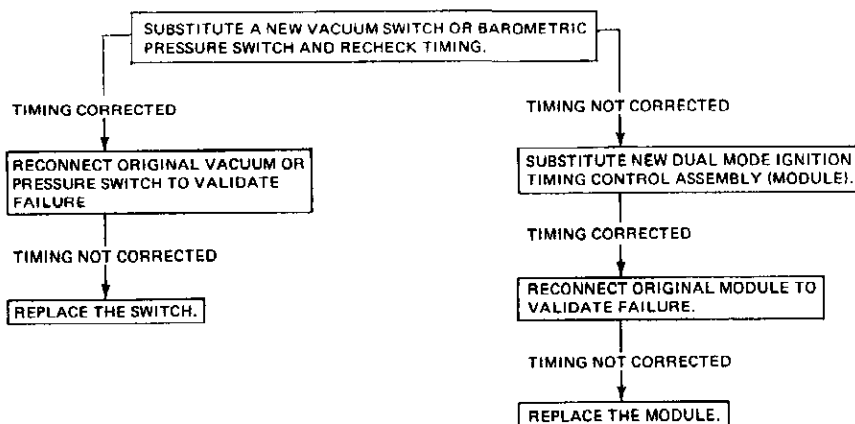


FIG. 25 Vacuum Switch Diagnosis

5. With TSP de-energized (2.8L engine at curb idle) and vent valve plunger depressed, measure the clearance between the vent valve plunger and the actuating lever.
6. Clearance should be within specification. Bend actuating lever as required to obtain the specified clearance.

B. Solenoid Switch Vent (If so equipped)

1. Remove air cleaner assembly.
2. Place hand on switch vent assembly and turn the ignition switch on and then off.
3. If solenoid activates/deactivates (an audible click should be heard and felt with the hand), reinstall air cleaner assembly.
4. If solenoid does not activate/deactivate, disconnect electrical lead.
5. Connect volt meter and insure that voltage is being applied to the solenoid. Repair as required.
6. If solenoid is receiving applied voltage, check for binding/plugged vent valve. Clean and/or repair as required.
7. If solenoid valve is not bound or plugged, replace the solenoid/valve assembly.

II. Model 4350 Carburetor

1. Disconnect external fuel bowl vent hose from the carburetor. Connect an external vacuum source to the vent hose. Turn the ignition key to the "ON" position. Apply 10 in Hg vacuum and observe the bleed-down rate. If unable to obtain a vacuum, or if the 10 in Hg vacuum bleeds down in less than 3 seconds, the solenoid vent valve has failed opened. Replace the valve.
 2. Turn the ignition key to the "OFF" position. Try to apply vacuum to the vent hose. If able to obtain a vacuum, the solenoid vent valve has failed closed. Replace the valve.
 3. Reconnect vent hose to the carburetor.
- Note: Be sure that the carburetor bowl vent line has a continuous downward slope to the evaporative canister.

Internal Fuel Bowl Vent Clearance Set and External Vent Check

2700 Carburetor Internal Vent Setting

1. Inspect the valve and linkage for damage.
2. Disconnect the bowl vent line at the carburetor. Check for plugged vent line by connecting a 21-0014 hand vacuum pump or equivalent to the vent line. If a vacuum is maintained the line is plugged. Clean, repair and/or replace as required. With the line already disconnected at the carburetor, disconnect the line at the carbon canister. Check for any liquid in the line by blowing shop air through it. Clean, repair and/or replace as required.

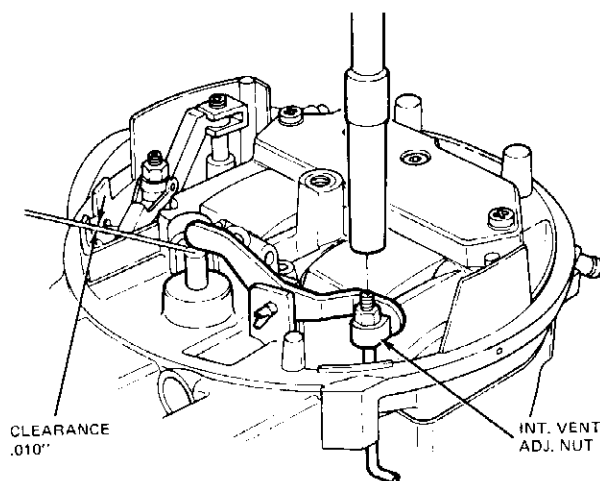
NOTE: If the bowl vent line has liquid in it, the canister must also be checked for liquid.

3. If necessary, bring engine to normal operating temperature.
4. Check idle speed (with TSP energized or at curb idle for carburetors w/o TSP) to specifications. Adjust as required.
5. With TSP energized (at curb idle for carburetors w/o TSP) measure clearance between accelerator pump rod and accelerator pump lever (Fig. 26).
6. Clearance should be within specifications. If incorrect, turn accelerator pump adjusting nut to obtain specification (Fig. 26).

NOTE: Apply a slight downward pressure on the top of the nylon vent adjusting nut to take up linkage clearances when making this adjustment.

Model 1946 Carburetor

1. Apply parking brake and block the wheels.
2. Check curb idle speed and fast idle speed to specification. Adjust as required.
3. Turn the engine off.
4. Remove the air cleaner assembly. Remove the canister vent hose from the bowl vent located on the air horn. Check the condition of the canister vent hose. Clean, repair and/or replace as required.
5. Attach a vacuum hand pump (tool 21-0014 or equivalent), with a 3/8 inch adaptor hose to the bowl vent on the carburetor.



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FIG. 26 Internal Vent System—Model 2700 Carburetor

6. With the ignition switch in the off position, set the choke plate in the open position. Make sure that the fast idle cam mechanism is set at the engine curb idle position. Gently operate the vacuum hand pump and observe one of the following:
 - a. If the hand pump does not produce a vacuum, proceed to Step 7.
 - b. If a vacuum of 5-10 in Hg is present, perform Steps 8-12.
7. With the ignition off, set the throttle to the maximum "High Cam" position. Gently operate the vacuum hand pump and observe one of the following:
 - a. If the hand pump produces a 5-10 in Hg vacuum, the bowl vent is properly adjusted. Proceed to Step 13.
 - b. If a vacuum is not present, perform Steps 8-12.
8. With the ignition off, remove the three (3) bowl vent cover screws located on the top of the air horn.
9. Remove the bowl vent cover, gasket and spring. (CAUTION: The spring is located under the bowl vent cover.)
10. Set the throttle on the lower idle speed screw (solenoid off position). While pumping the hand vacuum pump, turn the adjustment screw (located in the middle of the nylon arm) counterclockwise $1/8$ of a turn at a time, until a vacuum is produced by the pump. Release the vacuum and turn the adjustment screw $1/2$ turn clockwise.
11. Reinstall the spring, gasket, vent cover and retaining screws.
12. Repeat Steps 6 and 7.
13. Remove all test equipment and verify that all hoses are reinstalled to their original location. Reinstall the air cleaner assembly.

Model YFA Carburetors

1. Check curb idle rpm to specification (with solenoid activated if applicable). Adjust as required.
2. Stop engine and turn ignition key to "on" position so that the solenoid is activated but the engine is not running (where applicable). Secure the choke plate in the wide open position.
3. Open the throttle so that the throttle vent lever does not touch the fuel bowl vent rod.
4. Close throttle and measure the travel of the fuel bowl vent rod at point "A" from open throttle position (Step 3 above) to idle position (Step 2 above). Travel of the fuel bowl vent rod at point "A" should be 0.060 ± 0.010 .
5. If out of specification, bend throttle vent lever at point indicated in Fig. 27 to obtain the required travel.

CARBURETOR FUEL BOWL VENT FUNCTION—FUNCTIONAL CHECK

—MODEL 5200 CARBURETOR AND—MODEL 6500 CARBURETOR (FEEDBACK)—2.3L ENGINE

1. Apply parking brake and block wheels.
2. Remove the air cleaner assembly and plug any vacuum hoses that required disconnection.

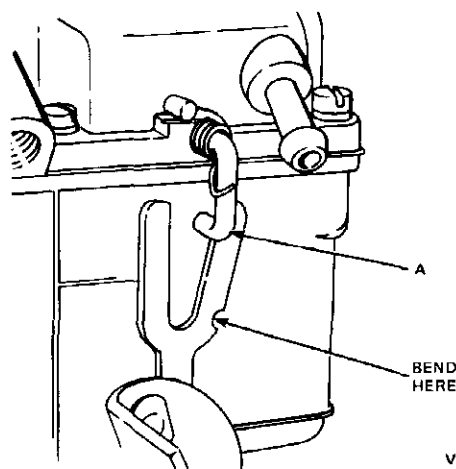


FIG. 27 Adjusting Fuel Bowl Vent Valve—Model YFA Carburetor

3. Remove the bowl vent-to-canister hose from the canister. Check bowl vent solenoid for external damage and electrical connections. Repair or replace as required.
4. Attach tool T75L-9487-A or equivalent to the canister end of the vent hose.
5. With the ignition switch in the **off position** and the choke plates held in the open position, force air into the fuel bowl vent system by squeezing the rubber bulb of T75L-9487-A tool or equivalent. Observe one of the following:
 - A. If fuel is displaced through the metering system of the carburetor, proceed to Step No. 6.
 - B. If no fuel is displaced through the metering system of the carburetor, start the engine, run it for two (2) minutes and turn it off. Then, repeat Step No. 5. If fuel is still not displaced through the metering system of the carburetor, proceed to Appendix "B", Step No. 4.
6. With the engine running at idle, force air into the fuel bowl vent system by squeezing the rubber bulb of T75L-9487-A tool or equivalent. Observe one of the following:
 - A. If the rubber bulb resists rapid squeezing (pressure builds up), the bowl vent is functioning properly. Proceed to Step No. 7.
 - B. If the rubber bulb does not resist rapid squeezing (pressure does not build up), proceed to Appendix "B", Steps No. 1, 2 and 3, as required.
7. Remove all test equipment (reassemble carburetor, install on engine—if removed and taken apart) and reinstall the air cleaner assembly.

CARBURETOR FUEL BOWL VENT FUNCTION

MODEL 5200 CARBURETOR AND MODEL 6500 CARBURETOR (FEEDBACK)—2.3L ENGINE

APPENDIX "B"

NOTE: The carburetor must be removed from the engine in order to remove and reinstall the bowl vent solenoid.

1. Disconnect the electrical lead to the bowl vent solenoid and connect it to one lead of a test light. Connect the second test light lead to ground.
2. With the ignition switch in the **on position**, observe one of the following:
 - a. If the test light glows, proceed to Step 3.
 - b. If the test light does not glow, either the vehicle's battery is dead or the electrical lead to the bowl vent solenoid has an open circuit and should be repaired/replaced as required. Then, repeat Step No. 5 of the functional check.
3. Remove the test light and reconnect the electrical lead to the bowl vent solenoid. Proceed to Step 4.
4. Remove airhorn.
 - a. Check for proper position of vent valve parts. The normal position of the parts should be as follows:
The plastic paddle should be flush against the aperture plate with a slight spring force supplied by the valve actuator. Push gently (5 oz. max.) on the valve actuator. The exterior vent should close and internal vent open (movement of .090 inch min.) if OK go to 4b. If no movement occurs, or excessive force is required to obtain movement, disassemble and check for:
 1. Binding in any part—free as required.
 2. Missing spring—install new spring.
 3. Foreign objects in assembly—remove objects.
 4. Plugged drillings in airhorn—open drillings.
 5. Diaphragm improperly installed—reassemble correctly.
 - b. Place hand vacuum pump (21-0014 or equivalent) nozzle into switch vent channel. Pump to 5" Hg vacuum and observe. Switch vent parts should shift to interior vent. Continue to pump to 19" Hg vacuum—measure leak-down time to leak to 10" Hg—should be more than 10 seconds. Apply 12 VDC between switch vent solenoid connector and airhorn casting. Gently push valve actuator to the energized position. Valve should be held by solenoid. Turn off 12 VDC—valve will then shift to normal position. If none of these conditions is met, replace the bowl vent solenoid and go to Step 7 of the functional check.

SSD-17—VALVE TRAIN INSPECTION

I. Removal of Rocker Cover

- A. Remove air cleaner.
- B. Disconnect and remove any hoses, wires, spark plug leads and components that would interfere with the removal of the rocker arm cover.
- C. Remove the rocker arm cover bolts. **
- D. Remove the rocker arm cover.

II. Static Valve Train Analysis

Check for damaged and/or severely worn parts, for correct assembly and assured use of correct parts, by proceeding as follows, with the static engine analysis.

- A. Rocker Arm Assemblies—individually mounted.
 1. Check for loose mounting stud and nut or bolt.
 2. Check for plugged oil feed in rocker arm.
- B. Rocker Arm Shaft Assemblies
 1. Check for loose mounting bolt(s).
 2. Check for plugged oil feeds.
- C. Push Rods
 1. Check for bent push rods.
- D. Valve Spring Assembly—with or without damper spring
 1. Check for broken or damaged parts.
- E. Retainer and Keys—both 2-piece and 1-piece retainers
 1. Check for proper seating of keys on valve stem and in retainer.
- F. Positive Rotator and Keys
 1. Check for proper seating of keys on valve stem and in positive rotator.
- G. Valves and Cylinder Head
 1. Check cylinder head gasket for proper installation. (For 2.8L engine, make sure there are three fingers visible on front of left head and three fingers visible on rear of right head.)
 2. Check for plugged oil drain back holes.
 3. Check for worn or damaged valve tips.
 4. Check for missing or damaged valve stem oil seals or guide-mounted oil seals.
 5. Check valve lash—mechanical tappet applications.
 6. Check collapsed tappet gap—hydraulic tappet applications.
 7. Check installed spring height.
- H. Overhead Cam Follower Arm and Lash Adjuster Assemblies
 1. Check for broken or severely worn parts.
- I. Camshaft—Overhead Camshaft Applications
 1. Check for plugged oil feed.
 2. Check for correct cam lift.

The preceding static checks are to be made on the engine prior to the following dynamic procedure.

III. Dynamic Valve Train Analysis

CAUTION: DO NOT USE THIS PROCEDURE FOR OVERHEAD CAMSHAFT ENGINES.

Start the engine and while running at idle check for proper operation of all parts. Check the following items under firing engine operating conditions:

- A. Rocker Arm Assemblies—individually mounted
 1. Check for plugged oil feed in rocker arm.
- B. Rocker Arm Shaft Assemblies
 1. Check for plugged oil feeds.
 2. Check for proper overhead valve train lubrication.

If a condition of insufficient oiling is suspected, accelerate engine to 1200 ± 100 rpm with transmission in neutral and engine at normal operating temperature. Oil should spurt from rocker arm oil holes such that valve tips and rocker arms are well oiled and/or, with rocker arm cover off, oil splash may overshoot rocker

arm. If oiling is insufficient for this condition to occur, check oil passages for blockage.

C. Push Rods

1. Check for bent push rods.
2. Check for proper rotation of push rods.

D. Positive Rotator and Keys

1. Check for proper operation of positive rotator.

E. Valves and Cylinder Head

1. Check for plugged oil drain back holes.
2. Check for missing or damaged valve stem oil seals or guide mounted oil seals.

IV. Reinstallation of Rocker Cover

- A. Remove old gasket from cover.
- B. Scrape both the rocker arm cover rail on the cylinder head and the gasket flange on the cover to remove all traces of the old gasket if necessary.
- C. Install a new gasket and replace the cover on the engine.
- D. Reinstall the rocker arm cover bolts** and tighten in accordance with applicable sequence and torque specification.
**To avoid interference with the distributor or the 2.8L V-6, it is suggested that a 1/2-inch drive and 10mm universal socket be used to remove or reinstall the rear rocker arm cover bolt.
- E. Reconnect all hoses, wires, spark plug leads and components that were removed in Part I.

SSD-18—CARBURETOR CLEANING PROCEDURE

Model 5200 Carburetors

This procedure is to be used if contamination must be removed from the carburetor.

After cleaning the carburetor, flush the fuel system and change the fuel filter.

For carburetor disassembly and assembly refer to the service manual.

1. Remove the carburetor from the vehicle.
2. Remove the following: (Note which items were removed from Primary and which from Secondary)
 - a. Remove the air horn
 - b. Remove high speed bleeds
 - c. Remove well tubes
 - d. Remove main metering jets
 - e. Remove idle jets
 - f. Remove limiter cap and idle adjustment screw (Note number of turns off seat)
3. Clean the fuel bowl and all of the items removed in Step 2.
4. Using compressed air, blow out the following main body channels in the listed order:
 - a. Primary idle channel from adjustment screw opening.
 - b. Primary and secondary idle channels from idle jet opening.

- c. Fuel bowl and primary and secondary main metering jet channels.
- d. Primary and secondary main well channels.
5. Using compressed air, dry off the items removed in Steps 2 b, c, d, e, and f above.
6. Install new fuel filter.
7. Adjust dry float setting. (See Part 24-10.)
8. Reassemble the carburetor using a new air horn gasket.
9. Check and reset as necessary:
 - a. Choke pulldown
 - b. Cam set
10. Reinstall carburetor on vehicle.
11. Check all idle speeds and idle fuel mixture to specification. Adjust as required.

2150 Carburetor

This procedure is to be used if contamination must be removed from the carburetor.

After cleaning the carburetor, flush the fuel system and change the fuel filter.

For carburetor disassembly and assembly refer to Part 24-10.

1. Disassemble and clean carburetor in the following sequence:
 - a. Remove air horn.
 - b. Note position on idle limiter caps.
 - c. Clean fuel bowl. Remove and clean float, inlet needle and seat, inlet filter screen.
2. If further cleaning is required, remove carburetor from vehicle and:
 - a. Clean fuel bowl. Remove and clean booster hold-down screw, booster assembly, pump weight, pump check ball.
 - b. Remove and clean accelerator pump cover, pump spring, power valve cover, power valve, main metering jets.
3. Using compressed air, dry all parts, blow out all channels in booster assembly (if applicable), main body and air horn.
4. Reassemble carburetor in reverse order of Steps 1 and/or 2. Use new gaskets for the following as required:
 - Power valve
 - Power valve cover
 - Booster assembly
 - Accelerator pump diaphragm
 Install new fuel filter.
5. If required, reinstall assembled carburetor to specifications on vehicle using new gaskets.
6. Check fuel level to specifications and adjust as required.
7. Reinstall air horn to specifications with new gasket.
8. Check all idle speeds and idle fuel mixture to specifications. Adjust as required.

Model 4350 Carburetors

This procedure is to be used if contamination must be removed from the carburetor.

After cleaning the carburetor, flush the fuel system and change the fuel filter.

For carburetor disassembly and assembly refer to Part 24-10.

1. Clean carburetor in the following sequence:
 - a. Set choke on high cam position and scribe a line on the air horn corresponding to the bottom of the "V" notch on the accelerator pump lever.
 - b. Remove external connections, air horn hold down screws, and air cleaner stud. Lift air horn assembly vertically from carburetor and place on a flat surface.
 - c. Clean fuel bowl.
 - d. Clean air horn assembly.
 - e. Remove needle drop limiter and float assembly. Clean as required.
 - f. Remove primary and supplementary inlet needle and seat assemblies. Remove fuel inlet filter and gasket.
2. If further cleaning is required, remove external connections, remove carburetor from vehicle and:
 - a. Separate main body and throttle body assemblies.
 - b. Remove and clean accelerator pump weight and pump check ball.
 - c. Clean carburetor bodies.
3. Replace fuel inlet assemblies, inlet filter and gasket with new components.
4. Set dry float level to specification and check supplementary inlet valve.
5. Align scribe line on air horn with "V" notch and check clearance (see chart) between needle drop limiter and primary inlet seat. Adjust as required by bending the foot on the limiter.

Applicable Description	Limiter to Seat Clearance (Inches)
7.5L (460 CID) Altitude Compensator Equipped	0.065
7.5L (460 CID) 49 States	0.035
6.6L (400 CID) 49 States and California	0.035

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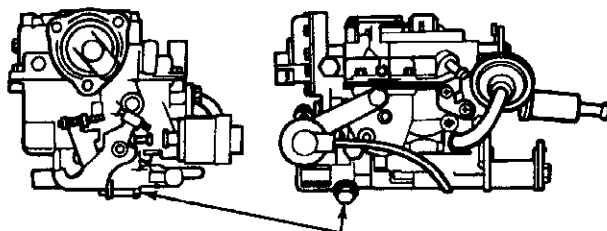
6. Reassemble carburetor on vehicle using new retainers at choke rod and pump rod.
7. Manually check operation of air valve and choke linkage to ascertain freedom of movement. Repair and/or replace as required.
8. Make all external connections to carburetor on vehicle.
9. Check all idle speeds and idle fuel mixture to specifications. Adjust as required.

Holley Model 1946 Carburetors

- This procedure is to be used if contamination is to be removed from the carburetor.
- After cleaning the carburetor, flush the fuel system and change the fuel filter.
- For carburetor disassembly and assembly refer to Part 24-08.

1. Remove carburetor from engine and:
 - a. Remove air horn.
 - b. Clean fuel bowl. Remove and clean float, inlet needle and seat, inlet filter screen, and blow out inlet channels with compressed air.

- c. Remove and clean idle jet and pump discharge weight and ball.
 - d. Remove and clean vacuum power valve, main metering jet and pump diaphragm assembly. (See Fig. 28).
 - e. Using compressed air, dry all parts, blow out all channels, parts, and fuel bowl.
 - f. Reassemble carburetor in reverse order (Steps B, C and D).
 - g. Adjust dry float setting to specification and reassemble air horn with new gasket.
2. Reinstall carburetor on vehicle with new gasket.
 3. Install new fuel filter.
 4. Check all idle speeds and idle fuel mixture. Adjust as required and install new limiter at maximum rich position.



NOTE: DO NOT REMOVE, ADJUST OR TURN THE W.O.T. FUEL ENRICHMENT SCREW DURING DISASSEMBLY OR ASSEMBLY OF THE CARBURETOR.

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FIG. 28 Disassembly Note—Holley Model 1946 Carburetor

Carter Model YFA Carburetors

This procedure is to be used if contamination is to be removed from the carburetor.

After cleaning the carburetor, flush the fuel system and change the fuel filter.

For carburetor disassembly and assembly refer to Part 24-06.

1. Remove carburetor from engine and:
 - a. Remove air horn.
 - b. Clean fuel bowl. Remove and clean float, inlet needle and seat, inlet filter screen, and blow out inlet channels with compressed air.
 - c. Remove and clean idle jet and pump discharge weight and ball.
 - d. Remove and clean step-up spring, metering rod, main metering jet and pump diaphragm assembly (Fig. 29).
 - e. Using compressed air, dry all parts, blow out all channels, parts, and fuel bowl.
 - f. Reassemble carburetor in reverse order (Steps B, C and D).
 - g. Adjust dry float setting to specification and reassemble air horn with new gasket.

2. Reinstall carburetor on vehicle with new gasket.
3. Install new fuel filter.
4. Check all idle speeds and idle fuel mixture. Adjust as required and install new limiter at maximum rich position.

NOTE:
DO NOT REMOVE, ADJUST,
OR TURN METERING ROD
ADJUSTING SCREW DURING
DISASSEMBLY OR ASSEMBLY
OF CARBURETOR.

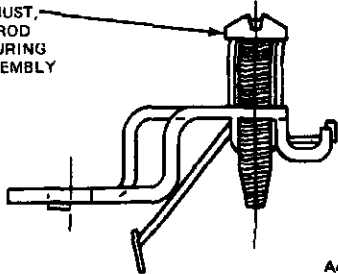


FIG. 29 Disassembly Note—Carter Model YFA Carburetor

Model 2700 Carburetors

This procedure is to be used if contamination is to be removed from the carburetor.

After cleaning the carburetor flush the fuel system and change the fuel filter.

For carburetor disassembly and assembly, refer to Part 24-27 of this Manual.

1. Clean carburetor in the following sequence:
 - a. Use compressed air to dry all parts.
2. Remove the carburetor from the vehicle.
 - a. Remove air horn assembly.
 - b. Clean fuel bowl
 - c. Remove and clean float assembly
 - d. Remove fuel filter (Appendix "B"), fuel inlet needle and seat
 - e. Remove and clean accelerator pump weight, pump check ball, and pump channels.
 - f. Remove the cranking solenoid and clean passage. See Appendix "A", for solenoid check procedure.
 - g. Blow out main well passages in air horn with 30 psi air pressure.
3. Replace fuel inlet needle and seat using new components.
4. Replace fuel filter according to Appendix "B".
5. Install cranking solenoid with a new lubricated "O" ring to the specified torque.
6. Set the dry float level to specification.
7. Assemble carburetor using a new air horn gasket and new retainers at the choke and pump rods.
8. Manually check operation of venturi valve and choke linkage for freedom of movement. Repair and/or replace as required.
9. Install carburetor on vehicle making all necessary external connections. **NOTE:** Choke heat tube nut connector may easily be cross threaded (use care).
10. Check choke heat system, according to SSD-12, Section III, Step 17.

11. Check idle speed and idle fuel mixture to comply with specification. Adjust as required.

Appendix "A" (Model 2700 Carburetor)

If electric cranking solenoid fails to click or a new solenoid check (Carburetor removed from vehicle).

1. Remove electric solenoid from the main body of the carburetor.
2. Apply a lead from the positive terminal of the vehicle battery to the cranking solenoid connector. Touch the solenoid body or case to a clean metal surface on the vehicle to provide a good ground. Observe if the cranking solenoid pintle retracts. If it does retract, proceed with Step 3. if not:
 - A. Check the battery for required voltage and its connectors for continuity.
 - B. Ensure that the solenoid body or case has a good ground.
 - C. If battery and ground are OK, replace the cranking solenoid and make voltage check on the new one.
3. Apply 5" Hg vacuum with a hand vacuum pump (21-0014 or equivalent) to outlet of cranking solenoid and observe for zero leak. Repeat three times operating solenoid between each check. If OK, proceed with Step 4. If not OK, replace solenoid and repeat checks starting with Step 2.
4. Install solenoid in main body of carburetor. Use a new "O" ring (lubricated with a mild soap and water solution) on the nose of the solenoid and torque to specification.
5. Remove Air Horn Assembly
 - A. Plug choke jet
 - B. Apply 5" Hg vacuum to cranking channel discharge hole. If no leak at the solenoid, unplug choke jet and proceed with Step 6. If leaking at the solenoid, check for choke jet blockage. If still leaking, remove solenoid and check "O" ring for proper seating. Repeat Step 4.
 - C. If "O" ring is cut, go back to Step 4. If "O" ring looks OK, then start from Step 3 and proceed.
6. Install air horn on body making all necessary connections.

Appendix "B"—Fuel Filter Replacement (Model 2700 Carburetor)

Removal

1. Remove the air cleaner.
2. Loosen (screw type) or remove (spring type) the clamp securing the fuel line to the fuel inlet fitting. Remove the line.
3. Unscrew the fuel inlet fitting and remove the fuel filter, gasket and spring.

Installation

1. Install the fuel filter spring, filter, inlet fitting gasket and the fitting into the carburetor.
2. Position the fuel line and clamp onto the fuel inlet fitting and tighten the clamp securely.
3. Start the engine and check for fuel leaks.
4. Replace the air cleaner on the carburetor.

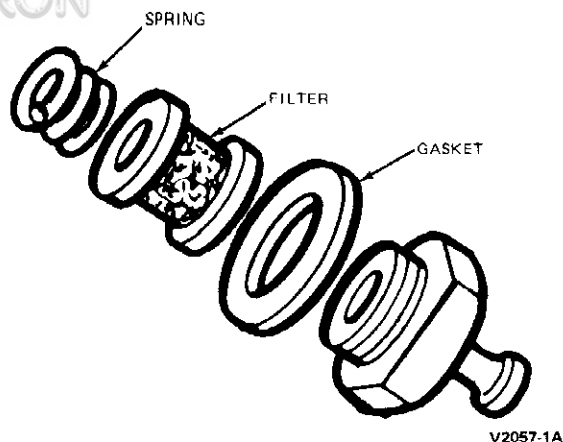


FIG. 30 Model 2700 Carburetor Fuel Filter

Appendix "C"—Venturi Valve Degumming Procedure (Model 2700 Carburetor)

1. Apply the parking brake and block the wheels.
2. Bring the engine to normal operating temperature and turn off.
3. Remove the air cleaner assembly, venturi valve cover and the two valve bearings. See Part 24-27 for exploded view.
4. Using automatic choke cleaner (C9AZ-19A501-B or equivalent), spray the venturi valve and valve diaphragm shaft until the surfaces are wet (not more than 2 seconds total). Manually cycle the valve and let stand (soak) for one minute.
5. Reinstall the bearings, cover, and air cleaner assembly.
6. Start the engine and let it run at high cam speed for three minutes.
7. Check for freedom of movement by cycling the throttle with the engine running. The valve should now respond rapidly to throttle position changes.

Model 6500 (Feedback) Carburetor

- This procedure is to be used if contamination must be removed from the carburetor.
- After cleaning the carburetor, flush the fuel system and change the fuel filter.
- For carburetor disassembly and assembly, refer to Part 24-14.

1. Remove the carburetor from the vehicle.
2. Remove the following: (note which items were removed from the primary and which from the secondary)
 - a. Remove the air horn
 - b. Remove high speed bleeds
 - c. Remove well tubes
 - d. Remove main metering jets
 - e. Remove idle jets
 - f. Remove limiter cap and idle adjustment screw. (Note turns off seat)
 - g. Remove main system diaphragm assembly (only if diaphragm is ruptured or leaking).

- h. Remove the main system feedback metering needle housing from the mainbody.
3. Clean the fuel bowl and all the items removed in Step 2.
4. Using compressed air, blow out the following main body channels in the listed order:
 - a. Primary idle channel from the adjustment screw opening.
 - b. Primary and secondary air bleed metering channels from the idle jet opening.
 - c. The fuel bowl; the primary, the secondary, and the main system feedback fuel metering channels.
 - d. Primary and secondary main well channels.
5. Using compressed air, dry off the items removed in Steps 2b through h above.
6. Install a new fuel filter.
7. Adjust dry float setting according to Part 24-14.
8. Reassemble the carburetor using a new air horn gasket.
9. Check and reset as necessary:
 - a. Choke pull down
 - b. Cam set.
10. Reinstall the carburetor on the engine.
11. Check all idle speeds and idle fuel mixture to specification. Adjust as required.

SSD-19—LEAK CHECKS - CARBURETOR SYSTEMS

I. Venturi Valve System (Model 2700 Carburetors)

1. Check for vacuum leaks.
2. Remove carburetor from the engine.
3. Remove the upper (carburetor) body from the carburetor (See Part 24-27).
4. Open throttle plate fully.
5. Cover both ports located at the rear of the choke side throttle bore with finger.
6. Depress diaphragm shaft fully.
7. Cover the rectangular hole on the top.
8. Release the diaphragm shaft.
9. Shaft should not move. If it does, repair and/or replace as required.
10. Reassemble the carburetor following procedures in Part 24-27.

II. Cranking System (Model 2700 Carburetors)

1. Check for fuel leaks.
2. Remove the carburetor from the engine.
3. Remove upper (carburetor) body from the carburetor (See Part 24-27).
4. Apply 8 inches of vacuum to the cold enrichment jet.
5. Seal off cold enrichment discharge channel with finger.
6. The 8 inches of vacuum should be maintained for a minimum of 30 seconds. If it is not, repair and/or replace as required.
7. Reassemble the carburetor following procedures in Part 24-27.

SSD-22 EVAPORATIVE EMISSION CONTROL SYSTEM

VAPOR PURGE CONTROL VALVE

I. Engine Will Not Start or Run

- A. Remove the purge line from the PCV line "Tee" and cap. Attempt to start the engine.
- B. If the engine now runs, proceed to the next step; if not, continue with the diagnostic routine pertaining to the complaint.
- C. With the engine running at idle, disconnect the vacuum signal hose from the purge valve, remove the valve from the evaporative canister and reconnect the purge line to the PCV line "Tee". If a **strong** hissing sound is heard from the purge valve, replace it. (Note: A **slight** hissing sound may be heard due to the small valve orifice.)
- D. Connect a vacuum gage to the vacuum signal hose to the purge valve. Bring the engine to normal operating temperature. With the transmission selector in neutral, run the engine at approximately 2000 rpm for 10-20 seconds. The vacuum gage reading should be at least 5" Hg minimum. If not, check the carburetor signal port for any blockage per Reference Two, Step 25, the ported signal PVS per SSD-1, the PCV per SSD-11, or the SDV and/or RDV per SSD-2. Repair and/or replace as required.
- E. With the purge valve still removed from the evaporative canister, connect a vacuum source to the purge valve and apply 5" Hg vacuum. With the engine idling, listen for a **strong** hissing. If a **strong** hissing is not heard, replace the valve.
- F. Disconnect the vacuum source from the purge valve and reconnect the vacuum signal hose. With the engine at idle, there should not be any **strong** hissing. If there is, check the SDV and/or RDV per SSD-2 and the ported signal per Reference Two, Step 25. Repair and/or replace as required.
- G. Reconnect all parts and hoses as originally equipped.

NOTE: Be sure that the carburetor bowl vent line has a continuous downward slope to the evaporative canister.

II. Engine Will Start and Run

- A. Start the engine and with it running at idle, disconnect the vacuum signal hose from the purge valve and remove the valve from the evaporative canister. If a **strong** hissing sound is heard from the purge valve, replace it. (Note: A **slight** hissing sound may be heard due to the small valve orifice.)
- B. Connect a vacuum gage to the vacuum signal hose to the purge valve. Bring the engine to normal operating temperature. With the transmission selector in neutral, run the engine at approximately 2000 rpm for 10-20 seconds. The vacuum gage reading should be at least 5" Hg minimum. If not check the carburetor signal port for any blockage per Reference Two, Step 25, the ported signal PVS per SSD-1, the PCV per SSD-11, or the SDV and/or RDV per SSD-2. Repair and/or replace as required.

- C. With the purge valve still removed from the evaporative canister, connect a vacuum source to the purge valve and apply 5" Hg vacuum. With the engine idling, listen for a **strong** hissing. If a **strong** hissing is not heard, replace the valve.
- D. Disconnect the vacuum source from the purge valve and reconnect the vacuum signal hose. With the engine at idle, there should not be any **strong** hissing. If there is, check the SDV and/or RDV per SSD-2 and the ported signal per Reference Two, Step 25. Repair and/or replace as required.
- E. Reconnect all parts and hoses as originally equipped.

Note: Be sure that the carburetor bowl vent line has a continuous downward slope to the evaporative canister.

SSD-23 THERMACTOR II (PULSED AIR) SYSTEM

1. With the engine off, inspect the hose(s) from the pulse air valve(s) to the air cleaner for any cracks, splits, holes, etc. Replace if required.
2. Inspect the hose clamp(s) at the pulse air valve(s) for being properly positioned and tightened. Correct, reposition, tighten or replace as required.
3. If the hose from the valve to the air cleaner is damaged, due to overtemperature and/or firing, the pulse air valve should be replaced.
4. Disconnect the thermactor hose(s) from the pulse air valve(s) to the air cleaner at the valve(s).
5. Connect the thermactor check valve tester (Tool T751-9487-A or equivalent) to the open end of the pulse air valve. Position the hose clamp and tighten to specification.
6. Squeeze the test bulb on the tester. The bulb should collapse completely. If bulb does not collapse, the pulse air valve should be replaced.
7. Remove all test equipment and connect the air hose(s) to the valve(s) and tighten clamp.

SSD-24 2.3L FEEDBACK CARBURETOR ELECTRONIC ENGINE CONTROL SYSTEM DIAGNOSTIC PROCEDURE

I. PURPOSE

- A. Determine if the feedback carburetor electronic engine control system is operating properly.
- B. Locate the cause if the system is not operating properly.
- C. This procedure is intended for vehicles with the throttle angle vacuum switch.

II. TEST EQUIPMENT REQUIRED

- A. Essential Special Service Tools Special tester.
 1. Meter: Digital volt/ohm meter T78L-50-DVOM
 2. Tester: T-78L-50-FBC-1
- Vacuum gage requirements:
SNAP-ON MT-14F or equivalent

Range, 0-25 $\pm$ 5 inches Hg

Resolution, 0.5 inch Hg

Accuracy, $\pm$ 3 percent of full scale, maximum

C. Vacuum tester: model 21-0014 or equivalent.

D. Tachometer

Requirements: Range, 0-3000 RPM

Accuracy, $\pm$ 40 RPM

Resolution, 20 RPM

E. Speed control tool: SNAP-ON GA-437 or equivalent.

III. PRE-CHECKS

A. Visual Inspection

Note: The system will not function properly if air or vacuum leaks exist, or if there are bad electrical connections. Therefore, the following checks should be made prior to testing the feedback system.

B. Inspect all vacuum lines per Fig. 34 for:

- 1) Proper connections to fittings.
- 2) Broken, cracked, or pinched vacuum lines.

C. Inspect the electrical harness (Fig. 34) for:

- 1) Loose or detached connectors.
- 2) Broken or detached wires.
- 3) Terminals not completely seated in the connector.
- 4) Partially broken or frayed wires at connectors.
- 5) Shorting between wires.
- 6) Excessive corrosion.

D. Inspect the system's major components, Fig. 34, for evidence of physical damage.

E. While the engine is running, check the exhaust manifold and around the exhaust gas oxygen sensor for leaks.

F. Repair or replace items as required and proceed to Step IV.

IV. TEST EQUIPMENT HOOK-UP

A. Turn ignition key "OFF."

B. Disconnect the harness connectors from the Electronic Control Unit (ECU).

C. Connect the test equipment to vehicle per Fig. 33. The hose length between the vacuum gauge and the test setup is critical. Hose length must be 3 ft minimum, 4 ft maximum and 5/32" ID. Remove air cleaner as required to install test equipment and perform tests.

D. Set DVOM to Battery Test. Verify battery exceeds minimum voltage requirements stated on TESTER.

CAUTION: When using the DVOM with the selector switch in the "TESTER" position, the test leads must be removed from the DVOM test jacks for proper operation.

V. PROCEDURE - SYSTEM CHECK

Note: Air cleaner cover or assembly may be removed and replaced during these subroutines.

A. This procedure assumes that the other diagnostic procedures (SSD'S) have been run in accordance with the appropriate routines.

B. Vehicle Will Not Start or Run

1. Verify that the IGNITION key is "OFF."
2. Remove the primary connector from the ignition coil and disconnect the four pin circular connector at the IGNITION MODULE.
3. Set DVOM Selector Switch to TESTER position. Set the TESTER Test Selector Switch to position 4.
 - (a) If the reading is greater than 10.0 (10000 ohms) recheck diagnostic routine 104.
 - (b) If the reading is less than 10.0 (10000 ohms), disconnect the square four pin in-line connector between the TESTER and the ECU.
 - I) If the reading is still less than 10.0 (10000 ohms), locate and repair the short in the electrical harness.
 - II) If the reading is greater than 10.0 (10000 ohms), replace the ECU.
 - (c) Reconnect all connectors. Verify vehicle will start and run properly.
 - If it will start and run, proceed to section Vc. of this routine.
 - If it will not start and run, return to Routine 104 of the Diagnostic Procedures.

C. Vehicle Conditioning

1. Block both front wheels.
2. Put PARKING BRAKE "on."
3. Start the engine and let it run in neutral or park until the thermostat is open and the upper radiator hose is hot and pressurized.
4. Turn all electrical loads OFF.

D. Data Collection

NOTE: Complete all data gathering per Test sequences I, II, and III prior to performing any diagnostic subroutines except as noted on the Data Chart. Air cleaner cover or assembly may be removed and replaced as required while performing the Test sequences.

1. Test Sequence I
Refer to "2.3L Feedback Carburetor Diagnostic Data Chart."
 - (a) Install speed control tool. Using tool, set engine speed within the 2200-2800 rpm range.
 - (b) Starting with the Test Selector Switch in position 1 and DVOM switch to TESTER position, record the required data on the chart.
2. Test Sequence II.
This test sequence requires that a function be timed. Therefore, read the procedure first and then perform it.
 - (a) At the VACUUM GAGE TEE (Fig. 33) fitting remove the control vacuum line that goes to the carburetor. At the same time, cover the tee opening with a finger and measure the time it takes the VACUUM GAGE and the VACUUM REGULATOR LIGHT to go to a steady indication.

- (b) Record the time on the data chart.
- 3. Test Sequence III.
 - (a) Set engine rpm in the 2200-2800 range.
 - (b) Reconnect the control vacuum line to the VACUUM GAGE TEE.
 - (c) Disconnect the vacuum line from the Cold Temperature Switch (PINK HOSE).
 - (d) Apply 4.5-5.5 in. Hg vacuum to the Cold Temperature Switch and record the required data on the data chart.
 - (e) While covering the carburetor idle air bleed hole, reduce the vacuum to zero (0) and record the required data on the data chart.
 - (f) Uncover the idle air bleed hole and record the required data on the data chart.
 - (g) Return engine to curb idle condition and verify reading is less than 0.3 (volts).
- 4. Turn the engine OFF, reconnect the vacuum lines to their normal fittings and reconnect all electrical connections. Proceed to Step V-E.

E. Data Analysis

- 1. Review the test data in "Diagnostic Data Chart." If all data is within limits the system is operating properly or the complaint is no longer present. Refer to V-E.4. If no additional testing is required, disconnect tester from harness and reconnect harness to ECU.
- 2. If one or more of the test points are out of limits, perform the subroutine indicated at the bottom of the appropriate column. The subroutines should be used in sequence from left to right.
- 3. Whenever a part is repaired or replaced, a retest is required. The retest should be:

- (a) Repeat Steps V-D.1. through V-D.4.

4. IMPORTANT

If the initial system check or a subroutine is completed and the cause of the complaint is not found and resolved, proceed as follows:

- (a) Verify that the initial problem still exists.
 - If it does, repeat the initial system check and/or the appropriate subroutine of this procedure.
 - If it does not, operate the vehicle on the road, or on a chassis dynamometer, or expose to the appropriate environment to try and induce the problem. Then repeat initial system check and/or the appropriate subroutine of this procedure.
 - Once the malfunction has been corrected, reconnect all vacuum and electrical connections per Fig. 34.
- (b) If the problem still has not been corrected go to the next step in the Diagnostic Routine, or repeat the Routine from the beginning, or perform the appropriate checks per reference One or Two of the Engine Diagnostic Procedures.

VI. PROCEDURE—COMPONENT CHECK

(Subroutines)

Note: Air cleaner cover or assembly may be removed and replaced as required during these subroutines.

A. Battery Voltage Not Within Limits

Start and run engine at idle to normal operating temperature (upper radiator hose hot and pressurized) and set the Test Selector SWITCH to position 1.

- 1. If the reading is less than 11.5 volts, check for one or more of the following conditions:
 - (a) Discharged battery. Charge or replace as required and retest.**
 - (b) Damaged ignition switch. Replace and retest.
 - (c) Wire between ECU and ignition switch Circuit No. 687 open or shorted, repair wire and retest.**
 - (d) Open ground wire between ECU and engine block. Connect test lead from TESTER continuity lead test jack to engine block. Set the Test Selector Switch in position 6. If reading is greater than 3.0 (ohms), repair the wire and retest.** (Circuit 57)
 - (e) Faulty voltage regulator (see Group 31).
- 2. If the reading is over 18.0 (volts), check battery electrolyte level, and fill, if required. Also, replace the voltage regulator if required and retest.**

B. Cold Temperature Switch or Throttle Angle Vacuum Switch Not Within Limits

Start engine, let it idle in neutral and verify that the engine is at normal operating temperature (upper radiator hose hot and pressurized).

- 1. Remove the vacuum line (PINK HOSE) from the Cold Temperature Switch and feel for vacuum.
 - (a) If no vacuum is present, proceed with Step VI-B.2.
 - (b) If vacuum is present, replace the Feedback Carburetor PVS (Feedback PVS, Fig. 33) and retest.**
- 2. Run the engine at 1500 rpm.
 - (a) Remove the vacuum hose from the Throttle Angle Vacuum Switch and feel for vacuum.
 - (b) If there is vacuum present, proceed to Step VI-B.3.
 - (c) If no vacuum is present, check for blocked vacuum hose or carburetor vacuum spark port. Repair or replace as required and retest.**
- 3. Turn the ignition KEY to "OFF" position.
 - (a) Disconnect the flat three pin connector between the Cold Temperature Switch/Throttle Angle Vacuum Switch Assembly and the harness.
 - (b) Set the Test Selector Switch to position 7.
 - (c) If the reading is greater than 1.0(1000 ohms), proceed to Step VI-B.4.
 - (d) If the reading is less than 1.0(1000 ohms), proceed to VI-B.3.e.
 - (e) Disconnect the square four pin Tester-to-ECU connector.

****Whenever a component has been repaired or replaced and a retest is required, conduct or repeat V-D.1. thru V-D.4.**

- (f) Set the Test Selector Switch to position 8.
- (g) If the reading is greater than 4.0 (ohms), replace the ECU and retest.**
- (h) If the reading is less than 4.0 (ohms) repair or replace the harness Circuit No. 75 and retest.**
- 4. Turn the ignition KEY to "ON" position/engine "OFF".
 - (a) Set the Test Selector Switch to position 2.
 - (b) If the reading is 10.5-18.0 (volts), proceed to Step VI-B.5.
 - (c) If the reading is less than 10.5 (volts), replace the Electronic Control Unit and retest.**
- 5. Turn the ignition KEY to "OFF" position.
 - (a) Reconnect the Cold Temperature Switch/Throttle Angle Vacuum Switch Assembly to harness.
 - (b) Set the Test Selector Switch to position 7.
 - (c) If the reading is less than 0.5(500 ohms), proceed to Step VI-B.7.
 - (d) If the reading is greater than 0.5(500 ohms), proceed to Step VI-B.6.
- 6. Apply 5.0 inches of vacuum to the Cold Temperature Switch.
 - (a) If the reading is 0.5 (500 ohm) or greater, replace harness Circuit No. 75 and retest.**
 - (b) If the reading is less than 0.5(500 ohms), replace the Cold Temperature Switch/Throttle Angle Vacuum Switch Assembly and retest.**
- 7. Remove the vacuum line (yellow hose) from the Throttle Angle Vacuum Switch and apply 5.0 inches of vacuum to the switch.
 - (a) Set the Test Selector Switch to position 8.
 - (b) If the reading is greater than 4.0 (ohms), proceed to Step VI-B.8.
 - (c) If the reading is less than 4.0 (ohms), replace the Cold Temperature Switch/Throttle Angle Vacuum Switch Assembly and retest.**

- 8. Disconnect and plug the vacuum hose from the Cold Temperature Switch.
 - (a) Set the Test Selector Switch to position 2.
 - (b) Run engine in the 2200-2800 rpm range.
 - (c) Apply zero and 5.0 inches of vacuum to Cold Temperature Switch.
 - (d) If the reading is 11.5-18.0 (volts) at zero inches of vacuum and less than 11.5 (volts) at 5.0 inches of vacuum, proceed to VI-B.9.
 - (e) If the reading is less than 11.5 (volts) at zero inches of vacuum and/or 11.5-18.0 (volts) at 5.0 inches of vacuum, replace the Cold Temperature Switch/Throttle Angle Vacuum Switch Assembly and retest.**
- 9. Reconnect all vacuum and electrical connections per Figure 34.
 - (a) Turn the Test Selector SWITCH to position 2.
 - (b) Turn the engine "OFF", and the ignition key to "RUN".
 - (c) Apply 5.0 inches of vacuum to Throttle Angle Vacuum Switch.
 - (d) If the reading is less than 10.5 (volts), replace the ECU and retest** (Step V-D.1.) and test sequence III (Step V-D.3).
 - (e) If the reading is 10.5-18.0 (volts), repeat test sequence I (Step V-D.1) and test sequence III (Step V-D.3.)
 - (f) If data chart is within limits, the system is operating properly or the problem is no longer present. Refer to V-E.4.

C. Exhaust Gas Oxygen (EGO) Sensor Not Within Limits

Use the following table to determine which diagnostic subroutine to use.

****Whenever a component has been repaired or replaced and a retest is required, conduct or repeat V-D.1. thru V-D.4.**

EGO Sensor Indicator	Solenoid Vacuum Regulator Light	Feedback Vacuum Control (in. Hg.)	Engine RPM Range	Subroutine Step
Rich	ON	4.5 - 5.5	2200 - 2800	VI - C.1.
Rich	ON	0 - 0.5	2200 - 2800	VI - C.2.
Rich	OFF	0 - 0.5	2200 - 2800	VI - C.3.
Lean	ON	4.5 - 5.5	2200 - 2800	VI - C.4.
Lean	OFF	4.5 - 5.5	2200 - 2800	VI - C.5.
Lean	OFF	0 - 0.5	2200 - 2800	VI - C.6.
Lean "blinking", rich "off"	BLINKING	N/A	2200 - 2800	VI - C.7.
Rich "blinking", lean "off"	BLINKING	N/A	2200 - 2800	VI - C.8.

CA4475-2A

FIG. 31 Diagnostic Subroutine Chart

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1. EGO Sensor Rich, Control Vacuum High, Vacuum Solenoid Light "on"

- (a) Check for proper operation of the CHOKE per SSD-12 and retest. If the complaint is still present proceed to the next step.
- (b) Check for proper operation of the CARBURETOR per SSD-31 and retest.**

2. EGO Sensor Rich, Control Vacuum Low, Vacuum Solenoid Lights "On"

With the engine rpm at 2200-2800, remove the control vacuum line from carburetor.

- (a) Check the vacuum at the input to the VACUUM SOLENOID REGULATOR. The vacuum should be greater than 10.0 inches Hg. If it is not, check for a vacuum leak or blockage in the feedback vacuum system (see Fig. 34) and repair or replace and retest.**
- (b) If the vacuum is greater than 10 inches reconnect the hose to the REGULATOR input and check the vacuum at the REGULATOR output port. If it is less than 4.5 inches, replace the VACUUM SOLENOID REGULATOR and retest.**
- (c) If the vacuum is greater than 4.5 inches, check the hose between the VACUUM REGULATOR and the CARBURETOR for leaks or blockage. Replace and retest.**
- (d) If the hose is O.K. check the CARBURETOR for vacuum leakage per SSD-31 and then retest.**

3. EGO Sensor Rich, Control Vacuum Low, Vacuum Solenoid Light "Off"

- (a) Disconnect the square 4 pin connector at the module—tester harness interface and set the Test Selector Switch to position 11.
 - If the reading is less than 10.5 (volts) proceed to step (b).
 - If the reading is greater than 10.5 (volts) replace the ECU and retest.**
- (b) Turn IGNITION switch to "OFF" and set the Test Selector Switch to position 5. Disconnect the two pin connector to the Vacuum Solenoid Regulator. Attach the Tester continuity lead probe to circuit 687A in the harness connector which mates to the Vacuum Solenoid Regulator (See Fig. 33 for pin location).
 - If the reading is greater than 3 (ohms), repair or replace 687A circuit and retest.**
 - If the reading is less than 3 (ohms) proceed to Step c.
- (c) Set the Test Selector Switch to position 12. Attach TESTER continuity lead probe to circuit 77 located in the harness connector which mates to the Vacuum Solenoid Regulator (see Fig. 33 for pin location). If the reading is less than 3 (ohms), proceed to Step (d). If the reading is greater than 3 (ohms), repair or replace circuit 77 and retest.**

- (d) Use the DVOM to measure the resistance of the Vacuum Solenoid Regulator coil. With the Selector switch in the 200 (ohm) position, this reading should be between 30-55 (ohms). If reading is not within this range, replace Vacuum Solenoid Regulator and retest.** If the reading is within limits, the system is operating properly or the specific problem is no longer present. Refer to V-E.4.

4. EGO Sensor Lean, Control Vacuum High, Vacuum Solenoid Light "On"

Replace the ECU and retest.**

5. EGO Sensor Lean, Control Vacuum High, Vacuum Solenoid Light "Off"

- (a) Verify that the IGNITION KEY is "OFF".
- (b) Check the VACUUM SOLENOID REGULATOR valve. Apply 12-14" Hg of vacuum to Vacuum Solenoid Regulator input port. If the vacuum gage reading at the output port is 2.0" Hg or more replace the Vacuum Regulator and retest.**
- (c) Disconnect the harness from the VACUUM SOLENOID REGULATOR to check circuit 77 for an open circuit. Set the Test Selector switch to position 12 and attach TESTER continuity lead Probe to circuit 77 in the harness connector which mates to the solenoid (see FIG. 33 for pin location). Measure the resistance. If the reading is less than 3 (ohms), proceed to Step (d). However, if the reading is greater than 3 (ohms), repair or replace circuit 77 and retest.**
- (d) Use the DVOM with the selector switch in the 2000 (ohms) position to check for a short to ground at the VACUUM SOLENOID REGULATOR connector. The resistance from both pins on the connector to ground should be greater than 300 (ohms). If the reading is less than 300 (ohms), replace the VACUUM REGULATOR and retest.**

6. EGO Sensor Lean, Control Vacuum Low, Vacuum Solenoid Light "Off"

- (a) Verify that the IGNITION KEY is "Off".
- (b) Disconnect the EGO sensor from the harness. Set the Test Selector Switch to position 13 and take a reading between the TESTER/CONTINUITY LEAD JACK on the TESTER and the EGO connector on the harness.
 - (c) If the reading is greater than 3 (ohms), repair or replace the wire (circuit 74) and retest.**
 - (d) If the reading is less than 3 (ohms), proceed.
 - (e) Connect the DVOM between the EGO sensor lead and the engine block. Disconnect and

****Whenever a component has been repaired or replaced and a retest is required, conduct or repeat V-D.1. thru V-D.4.**

move aside the air output hose from the AIR BYPASS VALVE. Start engine and let it idle until it has reached normal operating temperature (upper radiator hose hot and pressurized). Then operate engine for a minimum of 3 minutes between 2200 and 2800 rpm. Reduce engine speed to curb idle and immediately perform Step (f) and obtain reading per Step (g).

- (f) Place a finger over the carburetor IDLE AIR BLEED HOLE (see SSD-31 for location of the hole). After reading meter, reconnect hose to Air Bypass Valve.
- (g) If the meter reading is less than 0.55 (volts), replace the EGO sensor, and retest.**
- (h) If the voltage is 0.55 (volts) or greater, proceed.
- (i) Remove your finger from the IDLE AIR BLEED HOLE and reconnect the EGO sensor to the harness. Increase the engine speed to approximately 2200-2800 rpm.
- (j) If the EGO indicator is lean, check the CARBURETOR, per SSD-31 and retest. If the indicator varies between Lean and Rich, refer to SSD-5.

7. EGO SENSOR BLINKING "LEAN" ONLY, VACUUM SOLENOID LIGHT BLINKING.

- (a) Start engine and let it idle until it has reached normal operating temperature (upper radiator hose hot and pressurized). Set DVOM to TESTER, and Test Selector Switch to position 22.
- (b) Operate engine for a minimum of three minutes in the range of 2200-2800 rpm. Reduce engine speed to curb idle and immediately perform Steps (c) and (d).
- (c) Place a finger over the carburetor IDLE AIR BLEED HOLE (see SSD-19 for location of the hole).
- (d) If the meter reading is less than 0.55 (volts), remove and replace EGO SENSOR. If reading is 0.55 (volts) or greater, system is O.K. Check TESTER per TESTER MANUAL to verify it is functioning properly.

8. EGO SENSOR BLINKING "RICH" ONLY, VACUUM SOLENOID LIGHT BLINKING.

- (a) Start engine and let it idle until it has reached normal operating temperature (upper radiator hose hot and pressurized). Set DVOM to TESTER, and Test Selector Switch to position 22.
- (b) Operate engine for a minimum of three minutes in the range of 2200-2800 rpm.
- (c) With the engine still at 2200-2800 rpm, remove the vacuum hose to the Evaporative Control Canister at the fitting located in the vacuum line between the PCV valve and the carburetor. Observe the meter reading.
- (d) If the meter reading is greater than 0.25 (volts), remove and replace the EGO

SENSOR. If the reading is 0.25 (volts) or less, indicating the lean mixture, the system is O.K. Check the TESTER per TESTER MANUAL to verify it is functioning properly.

- (e) Reconnect vacuum hose to fitting.

D. Vacuum Solenoid Light Not Within Limits

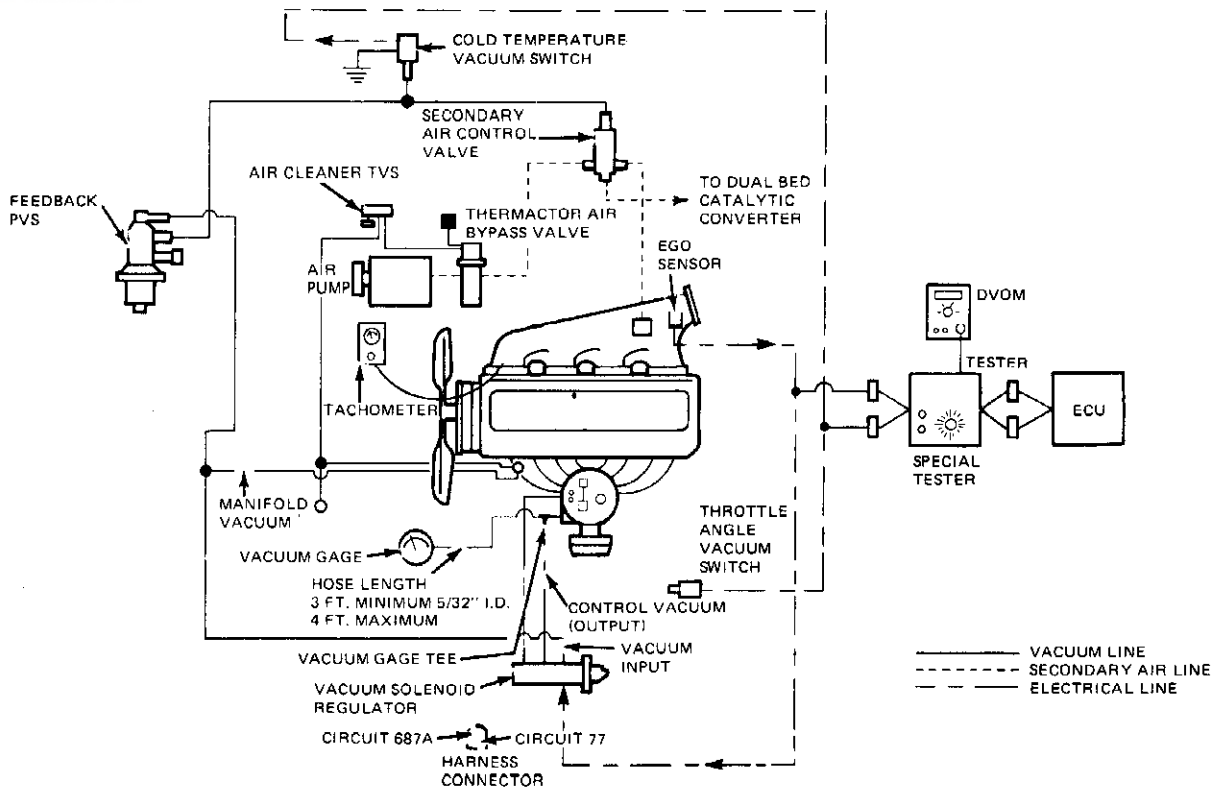
1. If the Vacuum Solenoid light in the Test Sequence II, (Fig. 32), changed from "Blinking" to "On" in more than the specified time, proceed to Step VI-D.2. If the Vacuum Solenoid light malfunctioned in any other manner, proceed to Step VI-D.3.
2. Set the Test Selector Switch to Position 4.
 - If reading is less than .5 (500 Ohms), replace ECU and retest**.
 - If reading is .5 (500 Ohms) or greater, repair open in circuit II and retest**.
3. If the other functions (EGO Sensor, Cold Temperature Switch and Throttle Angle Vacuum Switch) are OK, check the tester for a malfunction in the Vacuum Solenoid light circuit. (Refer to TESTER manual for instructions). If the tester is OK, proceed to the next step:
4. Turn the ignition switch to RUN position with engine OFF.
 - (a) Set the Test Point Selector Switch to position 11. If the meter reading is:
 - 7.0-14.0 (volts average), replace the ECU and retest**.
 - 4.5-7.0 (volts average) recheck the Tester for a malfunction in the Vacuum Solenoid Light circuit or retest V-D.1. through V-D.4. with a tester that is known to be operating properly.
 - 0.5-4.5 (volts average), replace the ECU and retest**.
 - 0.0-0.5 (volts average), continue testing.
 - (b) Set the Test Selector Switch to position 1.
 - If the reading is less than 10.5 (volts), repair or replace circuit 687 and retest**.
 - If the reading is 10.5 (volts) or greater, continue.
 - (c) Turn the ignition switch OFF and:
 - (1) Set the Test Selector Switch to position 5.
 - (2) Disconnect the two pin connector to the Vacuum Solenoid Regulator.
 - (3) Attach the tester Probe to Circuit 687A, located in the harness connector which mates to the Vacuum Solenoid Regulator (See Fig. 33 for pin locations).
 - If the reading is less than 3 (ohms), proceed to Step VI-D.4. (d).

****When a component has been replaced or repaired and a retest is required, conduct or repeat V-D.1. through V-D.4.**

Test Selector Switch						
Test Sequence	Vehicle Condition	No. 1 Vehicle Battery Voltage	No. 2 Cold Temperature Switch and Throttle Angle Switch	EGO Sensor Indicator	Vacuum Regulator Light	Feedback Vacuum Control
I Step V-D.1.	1. Front wheels blocked 2. Parking brake "ON" 3. Engine "Hot" in neutral 4. RPM = 2200 – 2800	Limits 11.5 – 18.0	Limits 11.5 – 18.0	Limits Alternating between Lean and Rich	Limits "Blinking"	Limits See Performance Specifications Book
II Step V-D.2.	1. Remove the carburetor feedback vacuum control line from TEE and immediately cover the TEE opening. 2. RPM = 2200 – 2800				Limits From "Blinking" to "ON" in ** sec. or less	Limits See Performance Specifications Book
III Step V-D.3.	1. Replace carburetor feedback vacuum control line. RPM = 2200 – 2800		Limits Condition 2: 0.3 (V) Max.		Limits Condition 2: Blinking	Limits See Performance Specifications Book
	2. Apply 5" vacuum to Cold Temperature Switch					
	3. While covering Carburetor idle air bleed-hole, remove vacuum from Cold Temperature Switch.		Condition 3: 11.5 (V) Min.		Condition 3: "ON"	
	4. Uncover idle air bleed hole.		Condition 4: 11.5 (V) Min.		Condition 4: Blinking	
	5. Return to curb idle		Condition 5: 0.3 (V) Max.			
		If out of limits, Stop Sequence & Proceed to V.I.A.	If out of limits* See VI-B.	If out of limits* See VI-C.	If out of limits* See VI-D.	If out of limits* See VI-E.
* Complete all data gathering per test sequence I, II, and III prior to performing any diagnostic subroutines, except as noted. ** See Performance Specifications Book.						

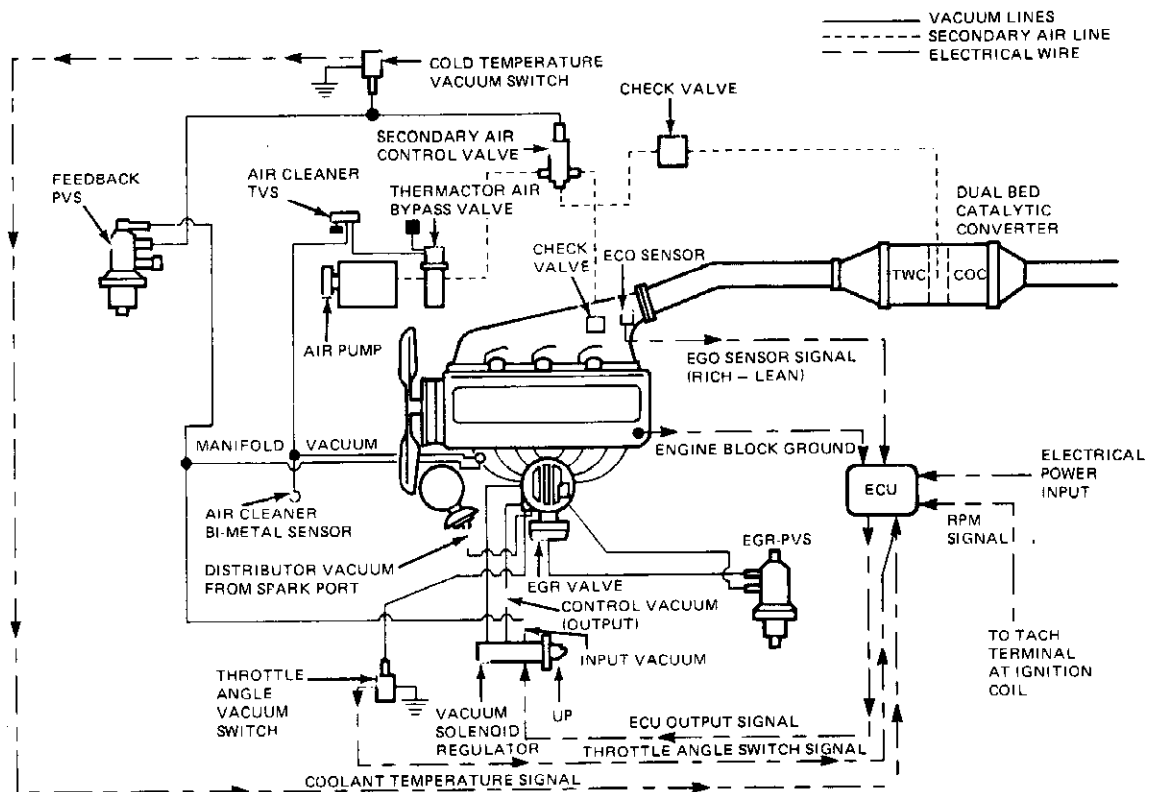
CA4476-2A

FIG. 32 Feedback Carburetor Diagnostic Data Chart



A4477-2A

FIG. 33 Test Connections—2.3L I-4 Electronic Engine Control System



A4478-2A

FIG. 34 Typical System Connections—2.3L Electronic Engine Control System

- If the reading is 3 (ohms) or greater, replace or repair Circuit 687A and retest**.

- (d) Set the Test Selector Switch to position 12. Attach TESTER continuity lead probe to circuit 77, located in the harness connector which mates to the Vacuum Solenoid Regulator (see Fig. 33 for Pin locations). If the reading is less than 3 (ohms), proceed to Step (3). If the reading is 3 (ohms) or greater, repair or replace circuit 77 and retest**.
- (e) Use the DVOM to measure the resistance of the Vacuum Solenoid Regulator Coil. With the DVOM Selector Switch in the 200 Ohm position, the reading should be between 30 and 55 ohms. If the reading is not within this range, replace the Vacuum Solenoid Regulator and retest**.
- (f) If the reading is within the appropriate range, the system is operating properly or the condition which caused the complaint is no longer present. Reconnect connector to the vacuum regulator solenoid. Go to section V-E.4.

E. Feedback Vacuum Control Not Within Limits

1. Disconnect the manifold vacuum input line from the VACUUM SOLENOID REGULATOR, connect the vacuum gage to that line. Start the engine, let idle in neutral, and measure the vacuum.

NOTE: Verify that the throttle is off the fast idle cam.

- a. If the vacuum is less than 12 inches Hg., check for leakage in the vacuum system or blocked vacuum hose. Repair and retest.
- b. If the vacuum is greater than 12 inches Hg., proceed to the next step.
2. Reconnect the manifold vacuum line to the VACUUM SOLENOID REGULATOR. Disconnect the vacuum control line from the CARBURETOR and connect the vacuum gage to it.
 - a. If the vacuum is less than 1.75 or greater than 3.25 inches Hg. average, replace the VACUUM SOLENOID REGULATOR and retest.**
 - b. If the vacuum is between 1.75 and 3.25 inches Hg. average, check the carburetor per SSD-31 and retest.**

SSD-25 5.0L (302 CID) ELECTRONIC ENGINE CONTROL (EEC-I) SYSTEM DIAGNOSTIC PROCEDURE

ELECTRONIC ENGINE CONTROL (EEC) SYSTEM

I. Purpose

- A. Determine if the EEC system is operating properly.
- B. Locate the cause if it is not operating properly.

II. Test Equipment Required

A. Essential Special Service Tools.

1. Meter: Digital volt/ohm meter (DVOM) T78L-50-DVOM
2. Tester: Model T78L-50-EEC-1 Including test fixtures:
 - a. Sensors(3) blue, yellow, brown
 - b. Ignition module(1) black
- B. *Tachometer Range: 0 to 3000 RPM Accuracy: ± 40 RPM Resolution: 20 RPM.
- C. *Vacuum/Pressure Gage requirements Range, 0-25+5, -0 inches Hg. 0-15+/-5 psi Resolution, 1/2 inches Hg maximum 0.25 psi maximum Accuracy, 3% Full scale, minimum
- D. Ohmmeter: DVOM, T78L-50-DVOM Voltmeter: DVOM, T78L-50-DVOM
- E. *Timing light 27-0002 or equivalent or magnetic pick up timing and advance meter.
- F. Speed control tool, Snap-On, GA-437 or equivalent.

*Alternate for items B, C, E and F, engine analyzer, 36-0037 or equivalent.

III. Pre-Checks

A. Visual Inspection

1. Remove air cleaner assembly and inspect all vacuum and pressure hoses for:
 - a. Proper connection to fittings
 - b. Broken, cracked or pinched conditions
2. Inspect the EEC Sub-system harness for:
 - a. Proper connection to the EGR solenoids, red wire to both, yellow wire to pressure and green wire to vent.
 - b. Loose or detached connectors.
 - c. Broken or detached wires.
 - d. Terminals not completely seated in the connector.
 - e. Partially broken or frayed wires at connectors.
 - f. Shorting between wires.
 - g. Excessive corrosion.
3. Inspect the sensors for evidence of physical damage.
4. Repair items as required, replace air cleaner assembly and proceed to Step IV.

IV. Test Equipment Hookup

- A. Turn ignition KEY "off."
- B. Disconnect the harness from the Electronic Control Assembly (ECA).
- C. Connect the test equipment to vehicle per Figure 35.
- D. Set the DVOM switch to "BATTERY TEST" and verify the reading is greater than the value stated on face plate. If the voltage is low consult the tester manual. Set the DVOM switch to position "TESTER."

CAUTION: When using DVOM with selector switch in "TESTER" position, test leads **MUST BE removed from DVOM "TEST LEADS" jacks** for proper operation.

- E. When necessary to remove air cleaner to perform a test or check-out, remove as required.
- F. If engine starts, proceed to step VI, if engine will not start, proceed to step V.

V. Engine Will Not Start

- A. Depress and hold the "NO START" switch on TESTER. Set ignition key to "start" position while attempting to start engine.
 1. If vehicle starts, release the "NO START" button and proceed to Step V-B.
 2. If vehicle fails to start, release the "NO START" button and proceed to Step V-C.
- B. Set the TESTER "TEST SELECTOR SWITCH" (TSS) to position "9" and ignition key to "run" position (verify engine is not running).
 1. If the reading is 10.5 (volts) or more, replace the ECA and verify the engine starts normally. Check the EEC system by performing steps VI-A thru VI-D.
 2. If the reading is less than 10.5 (volts), check for:
 - A discharged battery
 - Open wire from the battery to the ECA power relay coil (Circuit 175).
 - Open wire from the ignition switch to the ECA power relay coil (Circuit 20).
 - Open wire from the ECA to the ECA power relay coil (Circuit 361).
 - Inoperative ECA power relay.
 Repair or replace the damaged or worn component as required and retest. (1)
- C. Turn the IGNITION KEY off. Set the TSS switch to position 10.
 1. Disconnect Crankshaft Position (CP) connector and install the blue continuity test fixture to the wiring harness. Measure the resistance.
 - If the reading is between 100 and 250 (ohms) proceed to step 2.
 - If the reading is less than 100 or greater than 250 (ohms), check circuits 349 and 350 for an open or short. Repair the harness as required and retest (1).
 2. Remove the test fixture and reconnect the CP connector.
 - If the reading is less than 100 or greater than 550 (ohms) replace the CP sensor and retest (1).
 - If the reading is between 100 and 550 (ohms) proceed to step V-D.
- D. Set the TSS switch to position 11 and connect the black four pin CONTINUITY TEST FIXTURE to the four-blade, wiring harness connector at the ignition module.
 1. If reading is between 7-13 (ohms), disconnect test fixture, reconnect harness, and proceed to SSD-14.
 2. If the reading is less than 7 (ohms), check for short in circuits 57 and 144. If reading is greater than 13 (ohms), check for open in circuits 57 and 144. Repair harness as required and retest(1).

CAUTION: Remove test fixture and reconnect harness.

(1) Whenever a component has been repaired or replaced and a retest is required, conduct or repeat VI-A thru VI-B.

VI. Engine Runs

This procedure assumes that the other diagnostic procedures (SSD's) have been run in accordance with the appropriate routines.

A. Vehicle Conditioning

1. Block both front wheels.
2. Put the parking brake **on** and set transmission selector to "PARK".
3. Turn off all vehicle electrical loads (radio, air conditioner, heater and lights, etc.).
4. Crank Signal Check
 - a. Disconnect the harness wire from terminal "S" of the Starter Relay.
 - b. Set the tester "TEST SELECTOR SWITCH" (TSS) to position.
 - Verify that reading is greater than 5 (volts) with ignition key to "Start" position.
 - If not, proceed to step VI-D-11
 - If 5 (volts) or greater, reconnect wire to terminal "S" of Starter Relay and proceed to step C.
 - c. Start the engine. Let the engine run until the thermostat is open and the upper radiator hose is hot and pressurized. Check that throttle is off fast idle and on curb idle.
5. Turn the engine **off**, then turn the IGNITION KEY to the **run** position, engine "off."

B. Data Collection

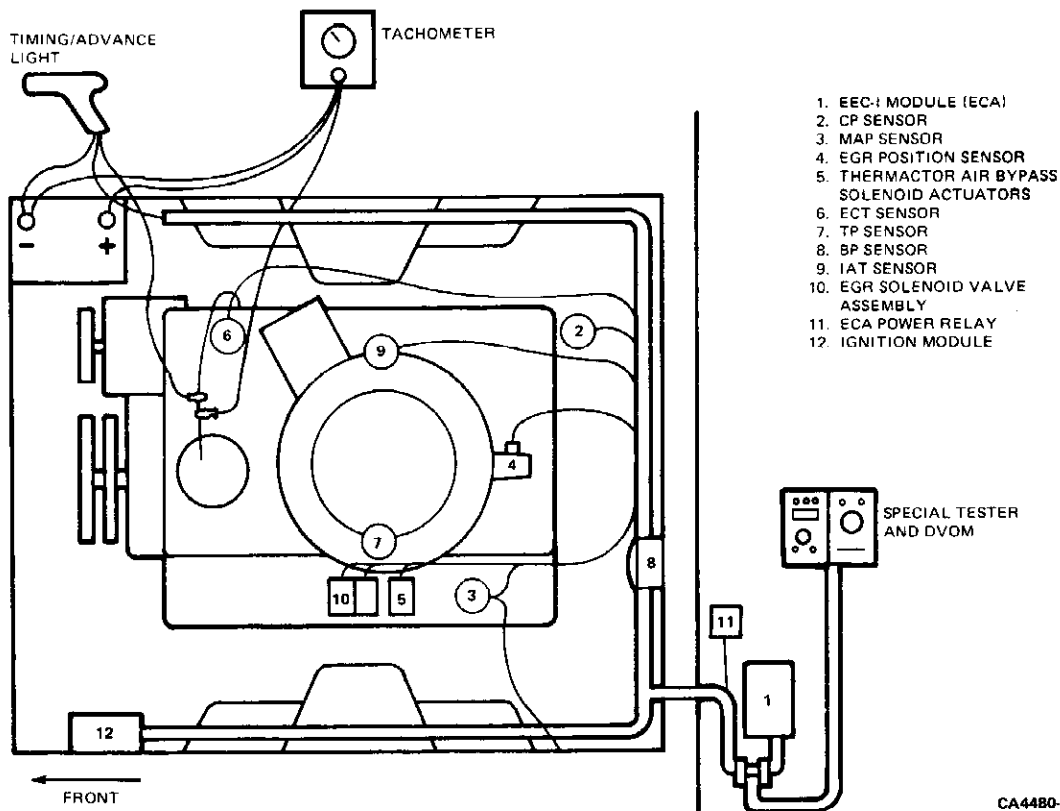
1. Set the TESTER "TEST SELECTOR SWITCH" (TSS) to position 1 and the DVOM selector switch to "TESTER". Turn Ignition Key to "RUN" position (engine "off").
2. Using the TSS switch on the special tester, gather the data for test sequence I and record it on the Diagnostic Data Chart (Fig. 36). Be sure the throttle is completely off fast idle.
 - If Vref is out of limits, proceed immediately to step VI-D.1. If Vref is within limits, complete gathering and recording data for Test Sequence I. Then, proceed to the following steps for Test Sequence II.

NOTE: Complete all data gathering per Test Sequences I and II prior to performing any diagnostic subroutine, except as noted on the Data Chart.

3. Prior to starting Test Sequence II, turn ignition key "off." Disconnect Manifold Absolute Pressure (MAP) and Inlet Air Temperature (IAT) Sensors from wiring harness.
 - Install CONTINUITY TEST FIXTURES as follows:

CAUTION: Check for correct pin orientation prior to mating.

 - a. MAP Sensor: Install YELLOW fixture to the harness MAP Sensor connector.



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FIG. 35 Test Equipment Hook-Up and Component Location

IRON

Vehicle Condition	Test Selector Switch Position								Spark Advance (degrees)
	1 Vref	2 MAP	3 TP	4 BP	5 BCT	6 IAT	7 TAB	8 EVP	
TEST SEQUENCE I (See Step VI.B.) 1. Parking brakes "on" 2. Engine, "off" & "hot", key "run" 3. All accessories "off" 4. Crank signal checked per VI.A.4.	Limits 8.5 – 9.5V ** Reading V	Limits table A Reading V	Limits 1.65 – 2.14V Reading V	Limits table A Reading V	Limits 1.9 – 3.7V Reading V	Limits 4.1 – 6.3V Reading V	Limits Greater Than 10.5V Reading V	Limits 1.09 – 1.61V Reading V	
TEST SEQUENCE II (See Step VI.B.) 1. Parking brakes "on" 2. Install test fixtures: MAP (yellow), IAT (brown) 3. Engine "hot" and "running" in "park" at "curb idle". All accessories "off". ④ Observe MAP and IAT data. ⑤ Raise RPM to 1600 – 1800. Start timing TAB when throttle returns to curb idle. ⑥ Set engine to 1600 ± 50 RPM. Observe EVP and Spark Advance.		Limits ④ 3.5 – 5.5V ** Reading V				Limits ④ 5.2 – 7.2V ** Reading V	Limits ⑤ Less than 1.6V changing to greater than 10.5V within 60 ± 5 sec. yes no	Refer ⑥ to engine emission label Reading V	Refer ⑥ to engine emission label Reading V
DATA ANALYSIS: (See Step VI.C.)	If out of limits** Step VI.D.1.	If out of limits* Step VI.D.2.	If out of limits* Step VI.D.3.	If out of limits* Step VI.D.4.	If out of limits* Step VI.D.5.	If out of limits* Step VI.D.6.	If out of limits* Step VI.D.7.	If out of limits* Step VI.D.8.	If out of limits* Step VI.D.10.

TABLE A	
Service Location Elevation (feet)	MAP and BP Limits
0 – 1000	6.7 – 7.8V
1000 – 2000	6.5 – 7.4V
2000 – 3000	6.2 – 7.3V
3000 – 4000	6.0 – 7.0V
4000 – 5000	5.8 – 6.8V
5000 – 6000	5.5 – 6.6V
6000 – 7000	5.3 – 6.4V

* Complete all data gathering per Test Sequence I and II prior to performing any Diagnostic Subroutine except as noted with "**".

** If reading is out of limits, perform indicated diagnostic Step prior to continuing Test Sequence.

* Complete all data gathering per Test Sequence I and II prior to performing any Diagnostic Subroutine except as noted with "****".

** If reading is out of limits, perform indicated diagnostic Step prior to continuing Test Sequence.

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FIG. 36 5.0L (302 CID) Diagnostic Data Chart

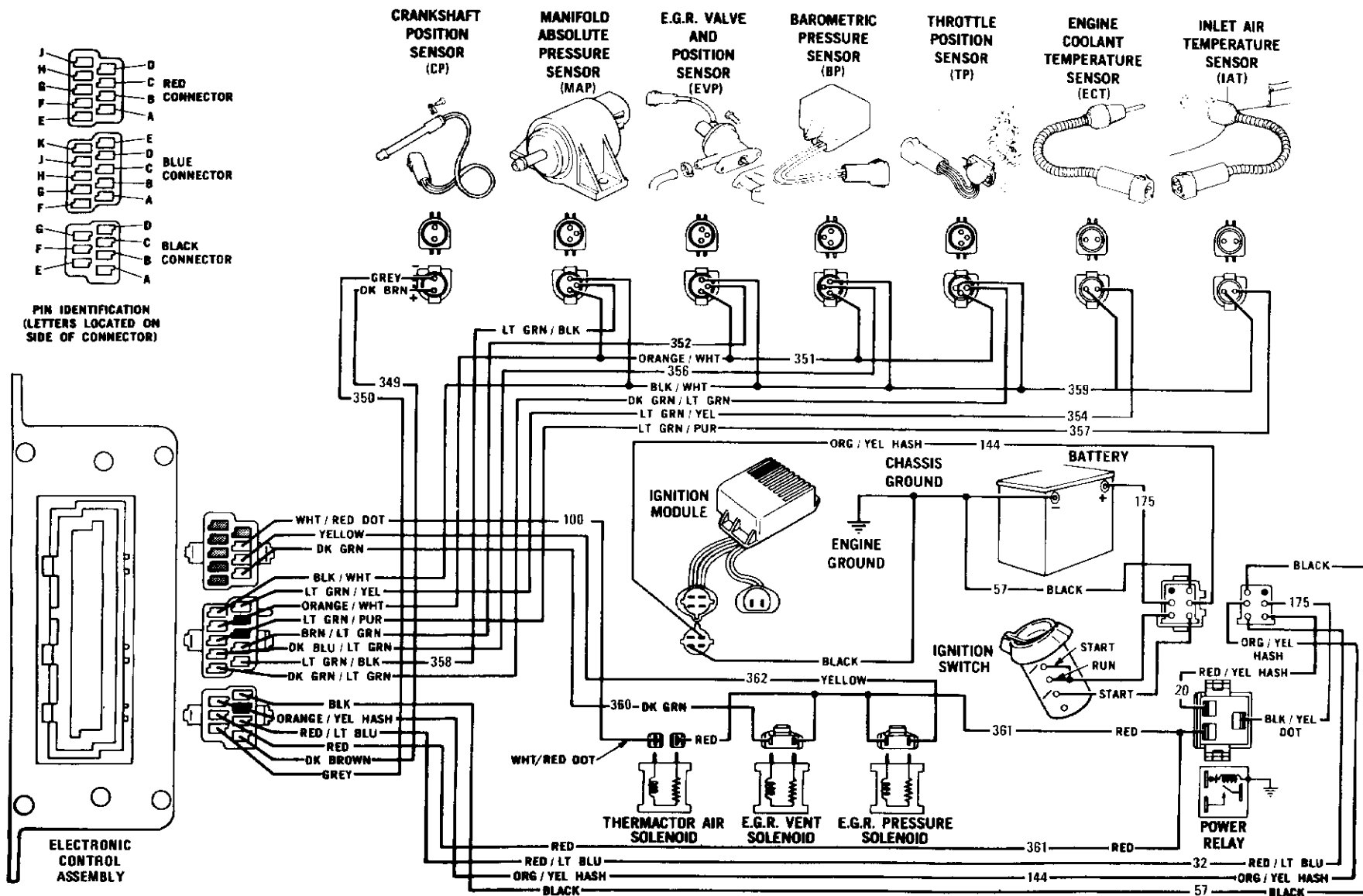


FIG. 37 EEC Subsystems Wiring Diagrams

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- b. IAT Sensor: Install BROWN fixture to the harness IAT Sensor connector.
- 4. Operate engine at "curb idle", in "park" until the thermostat is open and the upper radiator hose is hot and pressurized. Gather data for Test Sequence II per the following steps and record it on the Diagnostic Data Chart.
- 5. With engine at curb idle, obtain data for TSS switch positions 2 and 6 in Test Sequence II.
 - If either reading is out of limits, perform appropriate diagnostics steps listed in Data Chart before continuing.
- 6. Set TSS switch to position 7 and be prepared to make the indicated timed measurement.
 - Raise engine speed briefly to 1600-1800 RPM.
 - Begin timing, per Test Sequence II of Data Chart, when throttle is released for return to curb idle.
- 7. Install SNAP-ON #GA-437 speed control tool or equipment. Using tool, set engine speed to 1600 ± 50 RPM.
 - Obtain EVP and Spark Advance data per Diagnostics Data Chart.
- 8. Remove speed control tool and turn ignition key to "OFF".
- 9. Remove MAP and IAT continuity test fixtures (brown and yellow) and reconnect MAP and IAT Sensors to harness. Proceed to analyze data per paragraph C.

C. Data Analysis

1. Review the test data. If all data is within limits the system is operating properly, or the cause of the complaint is no longer present. Refer to Step VI-C3.
2. If one or more of the test points are out of limits, perform the subroutine indicated at the bottom of the appropriate column. The subroutines should be used in sequence from left to right.

IMPORTANT

3. If the initial system check or a subroutine is completed and the cause of the complaint is not found and resolved, proceed as follows: Turn engine off, remove all test equipment and reconnect all vacuum, air, and electrical connections.
 - a. Verify that the initial complaint still exists.
 - If it does, repeat the initial system check and/or the appropriate subroutine of this procedure.
 - If it does not, operate the vehicle on the road or on a chassis dynamometer or expose to the appropriate environment to try to induce the condition. Then repeat initial system check and/or the appropriate subroutine of this procedure.

- b. If the complaint still has not been resolved, perform one of the following steps as required.

- (1.) Go to the next step in the Diagnostic Routine.
- (2.) Repeat the routine from the beginning.
- (3.) Perform the appropriate checks per Reference One or Two of the Engine Diagnostic Procedures.

D. Component Diagnosis (Sub-routines) — See Fig. 37 for circuit.

1. Reference Voltage (Vref) Not Within Limits

- a. Turn the TSS switch to position 9, ignition key to RUN position and DVOM switch to TESTER.
 - If the battery voltage is less than 10.5 (volts), check for:
 - A discharged battery
 - Open wire from the battery to the ECA power relay coil (circuit 175).
 - Open wire from ignition switch to the ECA power relay coil (circuit 20).
 - Open wire from the ECA to the ECA power relay coil (circuit 361).
 - Inoperative ECA power relay.
 - Repair or replace the item as required and retest.(1)
 - If the battery voltage is greater than 10.5 (volts), proceed to Step VI-D-1b.
- b. Disconnect the Engine Coolant Temperature (ECT) sensor at its connector and set the TSS switch to position 1.
 - If the reference voltage is between 8.5 and 9.5 volts, replace ECT sensor and retest.(1)
 - If the reference voltage does not come within limits, proceed to the next step.
- c. Disconnect the Inlet Air Temperature Sensor (IAT) at its connector.
 - If the reference voltage is between 8.5 and 9.5 volts, replace IAT Sensor and retest.(1)
 - If the reference voltage does not come within limits, proceed to the next step.
- d. Disconnect the EGR Valve Position (EVP) Sensor at its connector.
 - If the reference voltage is between 8.5 and 9.5 volts, replace the EGR Valve assembly and retest.(1)
 - If the reference voltage does not come within limits, proceed to the next step.
- e. Disconnect the Throttle Position (TP) Sensor at its connector.
 - If the reference voltage is between 8.5 and 9.5 volts, replace TP Sensor and retest.(1)

(1) Whenever a component has been repaired or replaced and a retest is required, conduct or repeat VI-A thru VI-B.

- If the reference voltage does not come within limits, proceed to the next step.
- f. Disconnect the Manifold Absolute Pressure (MAP) Sensor at its connector.
 - If the reference voltage is between 8.5 and 9.5 volts, replace MAP Sensor and retest.(1)
 - If the reference voltage does not come within limits, proceed to the next step.
- g. Disconnect the Barometric Pressure (BP) Sensor at its connector.
 - If the reference voltage is between 8.5 and 9.5 volts, replace EP Sensor and retest.(1)
 - If the reference voltage does not come within limits, proceed to the next step.
- h. Disconnect the blue (10 pin) harness connector from the TESTER.
 - If the reference voltage is within 8.5 - 9.5 volts check circuits 351 (A,B, C and D), 354 and 357 for a short or check circuits 359 (A thru F) for an open. Repair the circuit and retest.(1)
 - If the reference voltage does not come within limits, replace the ECA and retest.(1)
- i. Reconnect all sensors to the harness and the harness to the TESTER. Complete gathering and recording data per Test Sequences I and II of Diagnostics Data Chart.

2. Manifold Absolute Pressure (MAP) Sensor — Not Within Limits

Note: If MAP reading is **not** within limits during Test Sequence I, proceed to step VI.D.2.a. If **not** within limits during Test Sequence II, proceed to step VI.D.2.e.

- a. On the DIAGNOSTIC DATA CHART, compare the MAP and BP sensor readings of TEST SEQUENCE I.
 - If the MAP reading is within 0.75 volts of the BP reading, both sensors are OK. **DO NOT CHANGE THEM** — the out of tolerance condition is the result of variations in local air pressure.
 - If the MAP reading differs from the BP reading by 0.75 volts or more, proceed to step VI.D.2.b.
- b. Verify that the ignition switch is "off" and disconnect MAP sensor. Connect the yellow CONTINUITY TEST FIXTURE to the wiring harness. Set the TSS switch to position "13", and DVOM switch to TESTER.
 - If the reading is between 100 and 250 (ohms), proceed to next step.
 - If the reading is less than 100 (ohms) or more than 250 (ohms), repair short or open in circuit 358 and/or 359 of wiring harness and retest.(1)

- c. Set the TSS switch to position "12".
 - If the reading is less than 100 (ohms) or more than 250 (ohms), repair short or open in circuit 351 and/or 359 of wiring harness and retest.(1)
 - If the reading is between 100 and 250 (ohms), inspect the sensor connector. If bad, repair. If good, replace MAP sensor and retest.
 - If the voltage is still out of limits, replace ECA and retest.(1)
- d. Turn TESTER FUNCTION switch to "off" and disconnect the test equipment.

CAUTION: Remove CONTINUITY TEST FIXTURE.

- e. If MAP reading is not within limits during TEST SEQUENCE II,
 - Turn ignition key "OFF".
 - Remove YELLOW CONTINUITY TEST FIXTURE from MAP connector of harness.
 - Using DVOM on 2000 ohm range, check resistance between adjacent pins of YELLOW test fixture.
 - If resistance is less than 170 (ohms) or greater than 230 ohms, repair or replace test fixture (refer to TESTER INSTRUCTION MANUAL) and repeat TEST SEQUENCE II.
 - If resistance is within 170 to 230 (ohms), carefully align pins of YELLOW test fixture with MAP connector of harness and reconnect. Repeat TEST SEQUENCE II.

3. Throttle Position (TP) Sensor Not Within Limits

- a. Verify that the ignition switch is off. Set the TSS switch to position 12, and the DVOM switch to "TESTER". Disconnect the TAP connector and connect the yellow CONTINUITY TEST FIXTURE to the TP sensor harness connector.
 - If the reading is between 100 and 250 (ohms), proceed to the next step.
 - If the reading is less than 100 (ohms) or more than 250 (ohms), repair the short or open in circuit 351 and/or 359 and retest.(1)
- b. Set the TSS switch to position 14.
 - If the reading is between 100 and 250 (ohms), proceed to next step.
 - If the reading is less than 100 (ohms) or more than 250 (ohms), repair the short or open in circuit 355 and/or 359 and retest.(1)
- c. Connect DVOM between circuit 351 and circuit 359 of the TP Sensor connector. Set DVOM switch to 200 x 1000 ohms range.
 - If the reading is less than 3(x1000 ohms) or more than 5(x1000 ohms), replace the sensor and retest.(1)

(1) Whenever a component has been repaired or replaced and a retest is required, conduct or repeat VI-A thru VI-B.

- If the reading is between 3(x1000) and 5(x1000 ohms), proceed to the next step.
- d. Connect DVOM between circuit 355 and circuit 359 of the connector. Set DVOM switch to 2000 ohms range. Verify the throttle is in the closed position (i.e., off high cam).
 - If the reading is less than 580 (ohms), or greater than 1100 (ohms), readjust by loosening the bolt and turning the TP sensor until the reading is within limits and retest.(1) If not able to set to this range replace the TP sensor and retest.
- NOTE:** Torque mounting screws to 8-10 in.-lbs.
- If the reading is between 580 and 1100 (ohms) reconnect the sensor to the harness. Set the TSS switch to position "3", key to "run" position and DVOM to "TESTER". Adjust the sensor by loosening the bolt and turning the TP sensor until the VOLTMETER reads 1.82 + 0.11 (volts). Retest. (1)
- NOTE:** Torque mounting screws to 8-10 in.-lbs.
- If the sensor cannot be adjusted to obtain the proper voltage replace the ECA and retest.(1)
- e. Turn DVOM switch to **off** and disconnect the test equipment.

CAUTION: Remove CONTINUITY TEST FIXTURE.

4. Barometric Pressure (BP) Sensor — Not Within Limits

- a. On the DIAGNOSTIC DATA CHART, review the BP and MAP readings of TEST SEQUENCE I.
 - If the BP reading is within 0.75 volts of the MAP reading, both sensors are OK. **DO NOT CHANGE THEM**—the out of tolerance condition is the result of variations in local air pressure.
 - If the BP reading differs from the MAP reading by 0.75 volts or more, proceed to step VI.D.4.b.
- b. Verify that the ignition switch is **off** and disconnect BP sensor. Connect the yellow CONTINUITY TEST FIXTURE to wiring harness. Set the TSS switch to position 12 and DVOM to TESTER.
 - If the reading is less than 100 (ohms) or more than 250 (ohms), repair short or open in circuit 351 and/or 359 of wiring harness and retest.(1)
 - If the reading is between 100 and 250 (ohms), proceed to next step.
- c. Set the TSS switch to position 15.
 - If reading is less than 100 (ohms) or more than 250 (ohms), repair short or open in circuit 356 and/or 359 of wiring harness and retest.(1)

- If the reading is between 100 and 250 (ohms), inspect the sensor leads and connector. If damaged, repair. If ok, replace BP sensor and retest.(1)
- If the voltage is still out of limits, replace the ECA and retest.(1)
- d. Turn DVOM switch to **off** and disconnect test equipment.

CAUTION: Remove CONTINUITY TEST FIXTURE.

5. Engine Coolant Temperature (ECT) Sensor Not Within Limits

- a. Verify that the ignition switch is **off**. Set the TPS switch to position 10, DVOM to TESTER. Disconnect the ECT connector and connect the blue CONTINUITY TEST FIXTURE to the wiring harness ECT connector.
 - If the reading is between 100 and 250 (ohms), proceed to the next step.
 - If the reading is less than 100 (ohms) or more than 250 (ohms), repair the short or open in circuit 354 or 359 and retest.(1)
 - b. Connect the DVOM between the two pins of the ECT sensor connector. Set DVOM switch to 200x1000 ohms scale.
 - If reading is greater than 6(x1000 ohms), verify engine coolant temperature, per diagnostics routine no. 124. If coolant temperature is below 160 degrees F (107 degrees C) follow routine no. 124 and retest (1). If coolant temperature is above 160 degrees F (107 degrees C) replace the sensor and retest.(1)
 - If reading is less than 1.5(x1000 ohms) verify engine coolant temperature per diagnostic routine no. 125. If coolant temperature is above 220 degrees F (140 degrees C) follow routine no. 125 and retest (1). If coolant temperature is below 220 degrees F (140 degrees C), replace the sensor and retest.(1)
 - If reading is between 1.5(x1000) and 6.0(x1000 ohms), replace ECA and retest.(1)
 - c. Turn TESTER FUNCTION switch to **off** and disconnect test equipment.
- CAUTION: Remove CONTINUITY FIXTURE.**

6. Inlet Air Temperature (IAT) Not Within Limits

NOTE: If IAT reading is **not** within limits during TEST SEQUENCE I, proceed to step VI.D.6.a. If **not** within limits during TEST SEQUENCE II, proceed to step VI.D.6.d.

- a. Verify the ignition switch is **off**. Set the TSS switch to position 17. Disconnect the IAT connector and connect the blue CONTINUITY TEST FIXTURE to the wiring harness.

(1) Whenever a component has been repaired or replaced and a retest is required, conduct or repeat VI-A thru VI-B.

- If the reading is between 100 and 250 (ohms), proceed to the next step.
- If the reading is less than 100 (ohms), or more than 250 (ohms), repair the short or open in circuit 357 and/or 359 and retest.(1)
- b. Connect the DVOM between circuit 357 and circuit 359 of the IAT sensor connector. Set DVOM switch to 200 (x 1000 ohms) scale.
 - If the reading is less than 6.5(x1000 ohms) or greater than 45(x1000 ohms), check air cleaner temperature control per SSD-9, if the temperature control is OK replace the IAT sensor and retest.(1)
 - If the reading is between 6.5(x1000) and 45(x1000 ohms) replace the ECA and retest.(1)
- c. Turn TESTER FUNCTION switch to **off** and disconnect test equipment.
- d. If IAT reading is **not** within limits during TEST SEQUENCE II,
 - Turn Ignition Key "OFF".
 - Remove BROWN CONTINUITY TEST FIXTURE from IAT connector of harness.
 - Using DVOM on 200 (x 1000 ohm) range, check resistance between pins of BROWN TEST FIXTURE.
 - If resistance is less than 23.3(x1000 ohms) or greater than 25.3(x1000 ohms), repair or replace test fixture (refer to TESTER INSTRUCTION MANUAL) and repeat TEST SEQUENCE II.
 - If resistance is within 23.3(x1000) to 25.3(x1000 ohms), carefully align pins of BROWN TEST FIXTURE with IAT connector of harness and reconnect. Repeat TEST SEQUENCE II.

7. Thermactor Air Bypass (TAB) Solenoid Not Within Limits

- a. Turn the TSS switch to position 7, DVOM to the TESTER position and the ignition key to the RUN position.
 - If reading is greater than 10.5 (volts) proceed to VI.D.7.b.
 - If reading is less than 10.5 (volts) check circuit 361. With a DVOM measure the voltage between circuit 361 and the engine block. If reading is less than 10.5 (volts) repair open in circuit 361 and retest. (1)
 - If circuit 361 reading is greater than 10.5 (volts) repair open in circuit 100 and retest.
- b. Install a vacuum gage between Thermactor Air Bypass (TAB) solenoid and air bypass valve. Operate engine at 1600 (+/-50) R.P.M. until vacuum stabilizes. Return to idle and observe vacuum (15" to 20" Hg.) drop to less than 1" Hg. within 60 (+/-5) seconds

after release of throttle for return to curb idle. If not, check thermactor air bypass valve per SSD-5. (1)

- c. If complaint still isn't resolved replace ECA (1).

8. EGR Valve Position (EVP) Sensor Not Within Limits

- a. Turn engine **OFF** and disconnect the EVP sensor. Connect the yellow CONTINUITY TEST FIXTURE to the wiring harness. Set the TSS switch to position 12, DVOM switch to TESTER.
 - If the reading is less than 100 (ohms) or more than 250 (ohms), repair the short or open in circuit 352 and/or 359 of the harness and retest. (1)
 - If the reading is between 100 and 250 (ohms) proceed to the next step.
- b. Set the TSS switch to position 18.
 - If the reading is less than 100 (ohms) or more than 250 (ohms), repair the short or open in circuit 352 and/or 359 of the harness and retest. (1)
 - If the reading is between 100 and 250 (ohms), proceed to the next step.
- c. Connect the DVOM between circuit 351 and circuit 359 of the EGR valve connector. Set DVOM switch to 200 (x 1000 ohms) scale.
 - If the reading is between 2.8 (x1000) and 5.3 (x1000 ohms), proceed to the next step.
 - If the reading is below 2.8 (x1000 ohms) or above 5.3 (x1000 ohms) replace the EGR valve assembly and retest. (1)
- d. Connect an OHMMETER between circuit 352 and circuit 359 of the EGR valve connector.
 - If the reading is between 350 and 940 (ohms), proceed to the next step.
 - If the reading is less than 350 (ohms) or greater than 940 ohms replace the EGR valve assembly and retest. (1)
 - Reconnect EVP connector to wiring harness.
- e. Disconnect the EGR air hose from the AIR BYPASS VALVE (small hose on side of valve) and connect the PRESSURE GAGE to the fitting. Leave EGR hose disconnected during this step. Run the engine at about 1600 RPM in **park**.
 - If the pressure is greater than 1.5 PSI proceed to VI-D-8.
 - If the pressure is less than 1.5 PSI check the AIR BYPASS VALVE per SSD-5 Step C 1.
- f. Connect a known good test hose between the small port at the side of AIR BYPASS VALVE and the EGR valve assembly. Run the engine at about 1600 RPM with transmission selector in **park** with the TSS switch in position 8.
 - If the voltage is 6.4 (volts) or less, replace the EGR valve and sensor

(1) Whenever a component has been repaired or replaced and a retest is required, conduct or repeat VI-A thru VI-B.

assembly and retest. (1)

- If the voltage is greater than 6.4 (volts), reinstall the original hoses and proceed to step VI-D9a. Reconnect all pressure and vacuum hoses to their proper connection.

9. EGR Solenoid Valve Check

- a. Turn the key to run (engine "off"). Set the TSS to position 19. Depress and hold the "EGR PRESSURE" test button on TESTER while reading DVOM.
 - If the reading is less than 1.0 (volt), repair the open circuit (check circuits 361 and 362) in the harness or replace the solenoid valve assembly as required and retest. (1)
 - If the reading is greater than 5.0 (volts), replace the solenoid valve assembly as required and retest. (1)
 - If the reading is between 1 and 5 (volts), proceed to the next step.
- b. Set the TSS to position 20 and depress and hold the "EGR VENT" button on TESTER.
 - If the reading is less than 1.0 (volt), repair the open circuit (check circuits 360 and 361) in the harness or replace the solenoid valve assembly as required and retest. (1)
 - If the reading is greater than 5.0 (volts), replace the solenoid valve assembly as required and retest. (1)
 - If the reading is between 1.0 and 5.0 (volts), proceed to the next step.
- c. Disconnect the pressure hose from the output side of the EGR pressure solenoid (lower fitting) and connect a pressure gage to the solenoid. Leave pressure hose disconnected. Run the engine at about 1100 $\pm$ 100 RPM with the transmission selector in **neutral** or **park**.
 - If the pressure is greater than 0.5 psi after 5 seconds, replace the solenoid valve assembly and retest. (1)
 - If the pressure is less than 0.5 psi, proceed to the next step.
- d. Reconnect the pressure hose to the output side of EGR pressure solenoid. Disconnect the EGR valve pressure hose at the hose tee and connect the pressure gage to the tee. Leave EGR valve hose disconnected. Run the engine at about 1100 $\pm$ 100 RPM with the transmission selector in **neutral** or **park**. Depress and hold the EGR PRESSURE and EGR VENT test buttons, on the TESTER, until the pressure stabilizes. Then release the EGR PRESSURE button.

- If the maximum pressure is less than 0.5 psi or decreases more than 0.5 psi in 5 seconds, replace the EGR solenoid assembly or hoses and fittings and retest. (1)
- If the maximum pressure is greater than 0.5 psi and decreases less than 0.5 psi in 5 seconds, proceed to the next step.

- e. With the engine at 1100 $\pm$ 100 RPM and EGR valve hose still disconnected, press and hold the EGR PRESSURE and VENT buttons until the pressure stabilizes. Release EGR PRESSURE button, then release the EGR VENT button. The pressure should drop IMMEDIATELY.
 - If the pressure remains within 0.5 psi of the maximum reading for 5 seconds replace the EGR solenoid assembly and retest.
 - If the pressure drops immediately, to less than half of the maximum reading, replace the EGR valve assembly and retest. (1)
 - If after retest, the EVP data is still out of limits, proceed to the next step.
- f. Replace the ECA and retest (1).

10. Spark Advance (in degrees) Not Within Limits

With the engine fully warmed-up, run the engine at idle, in park. Then depress and hold the "No Start" switch and check the Spark Advance.

- If the Spark Advance is within 8 to 12° BTDC, in the "Depress" mode, replace the ECA and retest. (1)

11. Crank Signal — Not Within Limits

- a. Using DVOM, test battery voltage (10.5 volts, minimum).
 - Recharge, repair, or replace as required and retest. (1)
- b. Disconnect harness wire from the "S" terminal on the Starter Relay and set TESTER TSS to position "22".
- c. With Ignition Key in "Start" position, verify reading is 5.0 (volts) or greater.
 - If reading is less than 5.0 (volts), check for an open or short in harness circuits 32 and 57. Repair as required and retest. (1)

CAUTION: Reconnect harness wire to "S" terminal on Starter Relay.

(1) Whenever a component has been repaired or replaced and a retest is required, conduct or repeat VI-A thru VI-B.

SSD-26 ENGINE IDLE SPEEDS

A. Pre-Adjustment Instructions (All Engine Speeds)

NOTE - Leave all vacuum signal hoses attached to the air cleaner assembly when relocating the assembly to perform carburetor adjustments. **The Air cleaner assembly must be installed, however, when measuring engine speeds.**

- Some engines may experience normal oscillations in idle speeds which could cause variations in engine speed measurement. If this condition is encountered, use the **average** engine speed.

- When performing engine rpm adjustments on vehicles equipped with the hydro-boost brake system, make certain the service brake pedal is not depressed - since engine rpm is affected by pedal pressure.

1. Apply the parking brake and block the wheels.

NOTE: If vehicle is equipped with automatic parking brake release, disconnect the vacuum line at the parking brake and plug the vacuum line.

2. Turn off all accessories. Start the engine, bring to normal operating temperature, and turn engine off.

3. On 2.3L engine applications equipped with thermactor systems, revise the dump valve vacuum hoses as follows:

- a. For dump valves with one or two vacuum hoses at the **side**, disconnect and plug the hose(s).
- b. For dump valves with one vacuum hose at the **top** only connected to the spark port in the carburetor, remove the hose at the dump valve and plug it. Connect a slave hose from the dump valve vacuum fitting to an intake manifold vacuum fitting.

4. Disconnect the fuel evaporative purge valve signal vacuum hose as follows: Trace the purge valve vacuum hose from the purge valve (located on the canister) to the first point where the vacuum hose can be detached from the underhood hose routing, (vacuum tee connection, etc). Disconnect the vacuum hose at **that** point, cap the open port, and plug the vacuum hose.

CAUTION: To prevent damage to the purge valve, do not disconnect the vacuum hose at the purge valve.

5. Check throttle and choke linkages for freedom of movement. Correct as required.
6. Connect a tachometer.

NOTE: If the engine has the "Dura Spark I" ignition system (blue coil tower), use tachometer 02-0362 or equivalent.

B. Fast Idle RPM

1. Revise the distributor vacuum advance hose as follows:

- a. On all engines **except** 2.8L/5.0L (302 CID) engines with Model 2700 carburetor, remove the spark delay valve, if so equipped, and route the distributor vacuum advance hose directly to the advance side of the distributor.

- b. On 2.8L/5.0L (302 CID) engines with Model 2700 carburetor, remove and plug the distributor vacuum advance hose.

2. Trace the EGR signal vacuum hose from the EGR valve to the carburetor:

- a. If an EGR/PVS valve or cold weather modulator is located in the vacuum hose routing, disconnect the EGR vacuum hose at the EGR valve and plug the hose.

- b. If not equipped with an EGR/PVS valve or cold weather modulator, **do not detach** the EGR vacuum hose.

3. On 2.3L engines with Model 6500 Feedback carburetor:

- a. Remove vacuum hose from cold start vacuum switch.
- b. Apply vacuum signal to cold start vacuum switch (5" Hg minimum). Use manifold vacuum or external source.

4. With the engine running at normal operating temperature, the choke plate fully opened, and the transmission in Neutral (M/T) or Park (A/T), place the fast idle lever on the specified step of the fast idle cam. Allow engine speed to stabilize and measure the fast idle rpm. Adjust if not within ± 100 rpm of specification.

NOTE: For engines with less than 100 miles of operation, the measured rpm should be the fast idle specification less the idle speed reduction (250 rpm on 4-Cyl. engines, 150 rpm on 6 and 8 Cyl. engines). If not, adjust to this rpm.

5. Run engine at approximately 2500 rpm for 15 seconds and recheck fast idle rpm.

6. On 5.0L (302 CID) engine with Model 2700 carburetor, check the auxiliary fast idle rpm as follows:

- a. Turn the engine off. Disconnect the vacuum hose from the vacuum-operated throttle modulator and plug the hose.

- b. Connect a slave vacuum hose from an engine manifold vacuum source to the throttle modulator.

- c. Start the engine and depress the throttle until vacuum modulator plunger extends fully. Then, release the throttle.

- d. Check the auxiliary fast idle rpm. If adjustment is necessary, loosen the locknut securing the modulator. Turn the modulator until the specified auxiliary fast idle rpm is obtained; then, tighten the locknut.

NOTE: For engines with less than 100 miles of operation, the measured rpm should be the auxiliary fast idle rpm less the idle speed reduction of 150 rpm. If not, adjust to this rpm.

- e. Remove the slave vacuum hose and reconnect the system vacuum hose.

7. Repeat Steps 4 thru 6 until the required fast idle rpm can be repeated.
8. Turn the engine off. Reconnect the vacuum line(s)/spark delay valve (if so equipped) removed in Steps 1 thru 3.

C. Curb Idle Speed (Also Includes "A/C-Off", "A/C-On", and "TSP OFF" Speeds, If so Specified

1. Before each speed check (includes re-check), run the engine at approximately 2500 rpm for 15 seconds in **neutral** or **park**. Allow engine to return to curb idle.
2. With the air conditioning selector in the OFF position (unless otherwise specified), the engine at normal operating temperature, the choke plate fully opened, and the transmission selector in the specified gear (see engine emission decal), measure each required engine speed as defined and specified on the engine emission decal. If not within ± 50 rpm of specification, adjust the respective engine speed as follows:

NOTE: —The method of adjusting each engine speed depends upon the speed-controlling device(s) employed. Therefore, examine the carburetor, determine the device(s) used, if they are functional, and then perform the adjustment procedure.

—Repeat Steps 1 and 2 until each engine speed is repeatable.

—On carburetors equipped with a dashpot, the dashpot clearance must be adjusted each time the curb idle speed is adjusted.

—For engines with less than 100 miles of operation, the measured rpm should be the required engine speed as defined less the idle speed reduction. If not, adjust to this rpm. The idle speed reduction values follow:

No. of Cylinders	Curb Idle	TSP-OFF Idle
4	50 RPM	50 RPM
6	75 RPM	75 RPM
8	50 RPM	75 RPM

CA4535-1A

2.3L Engine with Models 5200 and 6500 Carburetors

a. No Solenoid Device

- (1) Curb Idle rpm
Turn the throttle stop adjusting screw until the specified curb idle rpm is obtained. (Insure adjusting screw is against stop).
- (2) Dashpot Clearance (if equipped)
With the engine off, collapse the dashpot plunger and check the clearance between the plunger and throttle lever pad. Adjust if not in specified limits.

b. Anti-Diesel TSP or Anti-Diesel TSP with Vacuum-Operated Throttle Modulator (A/C Only)

- (1) Curb Idle rpm

Turn the TSP-ON idle adjusting screw until the specified curb idle rpm is obtained.

(2) TSP-OFF rpm

With the engine running, collapse the TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

c. Solenoid-Dashpot

(1) Curb Idle rpm

Adjust the curb idle rpm by turning the TSP-ON adjusting screw until the specified curb idle rpm is obtained.

(2) Dashpot Clearance

Dashpot clearance adjustment is not required. Clearance is controlled by the TSP.

(3) TSP-OFF rpm

With the engine running, collapse the solenoid-dashpot plunger by forcing the throttle lever pad against the TSP plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

d. Vacuum-Operated Throttle Modulator (A/C Only)

(1) Curb Idle rpm

Loosen the locknut securing the vacuum-operated throttle modulator and rotate the modulator until there is clearance between the modulator stem and the throttle lever pad. Adjust curb idle rpm by turning the throttle stop adjusting screw until the specified curb idle rpm is obtained.

Adjust the vacuum-operated throttle modulator by turning the modulator (locknut loosened) until the modulator stem contacts the throttle lever pad. Then, tighten the locknut.

e. Vacuum-Operated Throttle Modulator with Dashpot (A/C Only)

(1) Curb Idle rpm

Adjust the curb idle rpm by turning the throttle stop adjusting screw until the specified curb idle rpm is obtained.

NOTE: If the curb idle rpm cannot be adjusted low enough, loosen the TSP-ON adjusting screw on the throttle lever pad until sufficient clearance is present.

(2) Dashpot Clearance

Collapse the throttle modulator plunger and check the clearance between the stem pad and the TSP-ON adjusting screw on the throttle lever pad. If adjustment is necessary, turn the TSP-ON adjusting screw until the specified clearance is obtained between the screw and the modulator pad.

3.3L (200 CID) Engine with Model 1946 Carburetor

a. No Solenoid Device

(1) Curb Idle rpm

Turn the throttle stop screw until the specified curb idle rpm is obtained.

(2) Dashpot Clearance (if equipped)

With the engine off, collapse the dashpot

plunger and check the clearance between the plunger and throttle lever pad. Adjust if not in specified limits.

b. Anti-Diesel TSP

(1) Curb Idle RPM

Turn the TSP-ON adjusting screw until the specified curb idle rpm is obtained.

(2) TSP-OFF RPM

With the engine running, collapse the TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

3.3L/4.1L (200/250 CID) Engines with Model YFA Carburetor

a. No Solenoid Device

(1) Curb Idle RPM

Turn the throttle stop adjusting screw until the specified curb idle rpm is obtained.

(2) Dashpot Clearance (if equipped)

With the engine off, collapse the dashpot plunger and check the clearance between the plunger and throttle lever pad. Adjust if not to specified limits.

b. Anti-Diesel TSP

(1) Curb Idle RPM

Turn the throttle stop adjusting screw until the specified curb idle rpm is obtained.

(2) TSP-OFF RPM

With the engine running, collapse the TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

c. Anti-Diesel TSP and A/C TSP

(1) A/C-On RPM

—Move the climate control selector on the instrument panel to "A/C-On" to energize the front TSP.

—Open the throttle to allow the TSP plunger to extend fully. Then, release the throttle.

—Disconnect the A/C compressor clutch wire at the compressor.

—Check A/C-On rpm. If adjustment is required, loosen the locknut securing the front TSP and turn the TSP until the specified A/C-On rpm is obtained. Then tighten the locknut.

—After completion, move the climate control selector to the "off" position. Reconnect the A/C compressor clutch wire.

(2) A/C-Off RPM

Adjust the TSP—located at the back of the carburetor—by turning the hex head on the rear of the solenoid until the specified A/C-Off rpm is obtained.

(3) TSP-OFF RPM

With the engine running, collapse the back TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

2.8L/5.0L/5.8L/6.6L (302/351W/351M/400 CID) Engines with Model 2150 Carburetor
2.8L/5.0L (302 CID) Engines with Model 2700 Carburetor

NOTE: On engines equipped with the Model 2700 carburetor, the accelerator pump lever lash must be checked and adjusted (if necessary) each time the A/C-Off rpm or curb idle rpm is adjusted. Perform the following procedure:

—Apply a slight pressure downward on the top of the nylon nut located on the accelerator pump to take up the linkage clearances.

—Check the accelerator pump lever lash, between the top of the accelerator pump stem and the accelerator pump lever. Compare to specified clearance.

—If necessary, adjust the accelerator pump lash using the nylon nut on the accelerator pump rod to obtain the specified clearance.

a. No Solenoid Device

(1) Curb Idle RPM

Turn the throttle stop adjusting screw until the specified curb idle rpm is obtained.

(2) Dashpot Clearance (if equipped)

With the engine off, collapse the dashpot plunger and check the clearance between the plunger and the throttle lever pad. Adjust if not to specification.

b. Anti-Diesel TSP (Non-A/C Only)

(1) Curb Idle RPM

V-8 Engines: Adjust the solenoid positioner by rotating the long screw (part of the TSP mounting bracket) until the specified curb idle rpm is obtained.

2.8L Engines: Adjust the solenoid positioner by turning the hex head, located on the rear of the solenoid, until the specified curb idle RPM is obtained.

(2) TSP-OFF RPM

With the engine running, collapse the TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

c. A/C TSP (A/C Only)

(1) A/C-On Speed

—Move the climate control selector on the instrument panel to "A/C-On".

—Open the throttle to allow the TSP plunger to extend fully. Then, release the throttle.

—Disconnect the A/C compressor clutch wire at the compressor.

—Check A/C-On rpm and, if necessary, adjust as follows:

— **V-8 Engines:** Turn the long screw (part of the TSP mounting bracket) until the specified A/C-On rpm is obtained.

— **2.8L Engines:** Adjust the solenoid positioner by turning the hex head, located on the rear of the solenoid, until the specified A/C-On rpm is obtained.

—After completion, move the climate control selector to the "OFF" position. Reconnect the A/C compressor clutch wire.

(2) **A/C-Off RPM**

Turn the throttle stop adjusting screw until the specified A/C-OFF rpm is obtained.

7.5L (460 CID) Engine with Model 4350 Carburetor

a. Non-A/C (Except Police Interceptor)

(1) **Curb Idle RPM**

Turn the throttle stop adjusting screw until the specified curb idle RPM is obtained.

b. A/C TSP (Except Police Interceptor)

(1) **A/C-ON Speed**

—Move the climate control selector on the instrument panel to "A/C-ON".

—Open the throttle to allow the TSP plunger to extend fully. Then, release the throttle.

—Disconnect the A/C compressor clutch wire at the compressor.

—Check A/C-ON RPM and, if necessary, adjust as follows:

—Turn the long screw (part of the TSP mounting bracket) until the specified A/C-ON RPM is obtained.

—After completion, move the climate control selector to the "OFF" position. Reconnect the A/C compressor clutch wire.

(2) **A/C-OFF RPM**

Turn the throttle stop adjusting screw until the specified A/C-OFF RPM is obtained.

c. Anti-Diesel TSP: Police Interceptor A/C and Non-A/C Only

(1) **Curb Idle RPM**

Adjust the solenoid positioner by rotating the long screw (part of the TSP mounting bracket) until the specified curb idle rpm is obtained.

(2) **TSP-OFF RPM**

With the engine running, collapse the TSP plunger by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw until the specified TSP-OFF rpm is obtained.

D. Post-Adjustment Instructions (All Engine Speeds)

1. On 2.3L engines equipped with Thermactor systems, correct the dump valve vacuum hose routing (see Step 4 in Pre-Adjustment Instructions).
2. Reconnect the fuel evaporative purge valve signal vacuum hose (see Step 5 in Pre-Adjustment Instructions).

3. Stop engine. Remove all test equipment, reconnect automatic parking brake release (if disconnected), and torque the air cleaner wing nut(s) to specification.

SSD-27 V.O.A. PNEUMATIC EGR SYSTEM

I. Pneumatic EGR Valve Diagnostic Procedure

- A. To determine if the EGR valve is flowing exhaust gas, perform the following procedure:
 1. If necessary, warm the engine to normal operating temperature with the transmission in **neutral** or **park** and parking brake on.
 2. Remove the air cleaner assembly.
 3. Start the engine and let it idle with the transmission in neutral or park and the parking brake on.
 4. Remove the actuator pressure line (lower line) connected to the EGR valve and connect an external source of 10 ± 1 in Hg (5.0 ± 0.5 psi) pressure. Do not exceed 20" Hg (10 psi) pressure. See Fig. 38 for details.
 5. Remove the signal pressure line (upper line) connected to the EGR valve and connect an external source of 3 ± 0.5 in Hg (1.5 ± 0.3 psi) pressure. (Do not exceed 20 in Hg pressure.) The engine should idle rough and/or stall, *indicating that the EGR system is flowing.*
 6. If the engine does not stall or idle rough, remove the EGR valve and inspect the passages in the EGR valve, EGR spacer, EGR cooler and tubes for deposits or loose particles. If no deposits are present, replace the valve. If deposits are present, clean the passages per SSD 1, Part IV.
 7. To check the air pressure supply for the pneumatic EGR valve, remove the air supply line to the actuator nipple (as in Step 4). Install a pressure gauge in the line that was removed. Also install a thermactor pump pressure gauge (Tool T76L-9486-A or equivalent) to the air bypass valve outlet using a short length of appropriate diameter hose. If the air bypass valve has two outlet(s), plug the one without the tester. Start the engine and increase engine speed to 1000 rpm. Observe the pressure produced at the test gauges. The air pressure must be 2.25 psi minimum. If not, check all hoses to be sure they are open and not broken, split or cracked, and fit tightly onto the connectors. Repair and/or replace as required. If the hoses are OK, check the filter for plugging by installing the test gauge at the filter and repeating the test. Repair and/or replace as required. If the filter is OK, check the bypass valve per SSD 5, Section C(1).

NOTE: Be sure that the vacuum system for the bypass valve is intact and that the valve is not in the bypass mode while performing the above step.

8. Remove all test equipment, reconnect pressure line and install air cleaner. Torque wing nut to specification.
- B. If the engine idle quality is not acceptable, the EGR valve may not be sealing properly. To determine if the EGR valve is sealing properly, perform the following procedure:
 1. Check to make sure the vacuum/pressure hose routings are correct.
 2. If necessary, start the engine and warm it to normal operating temperature with the transmission in neutral or park and the parking brake on.
 3. Observe the idle quality.
 4. Stop the engine and remove the air cleaner assembly.
 5. Install a known good new EGR valve and gasket and adjust the engine idle to the specified curb idle.

6. Recheck the idle quality. If there is improvement in idle quality, retain the new EGR valve. If there is no improvement in the idle quality, the problem is elsewhere. Reinstall the original EGR valve and perform further engine diagnosis.
7. After resolving the complaint, remove all test equipment, reconnect pressure lines and install air cleaner assembly. Torque wing nut to specification.

II. Signal Conditioner Diagnostic Procedure

- A. If necessary, start the engine and warm it to normal operating temperature with the transmission in **neutral** or **park** and the parking brake on.
- B. Remove the air cleaner assembly.
- C. Remove the output line from the signal conditioner and install a 0-10 in Hg pressure gauge on the output port of the signal conditioner and note the change in the idle quality.
- D. If the complaint was rough idle and the idle

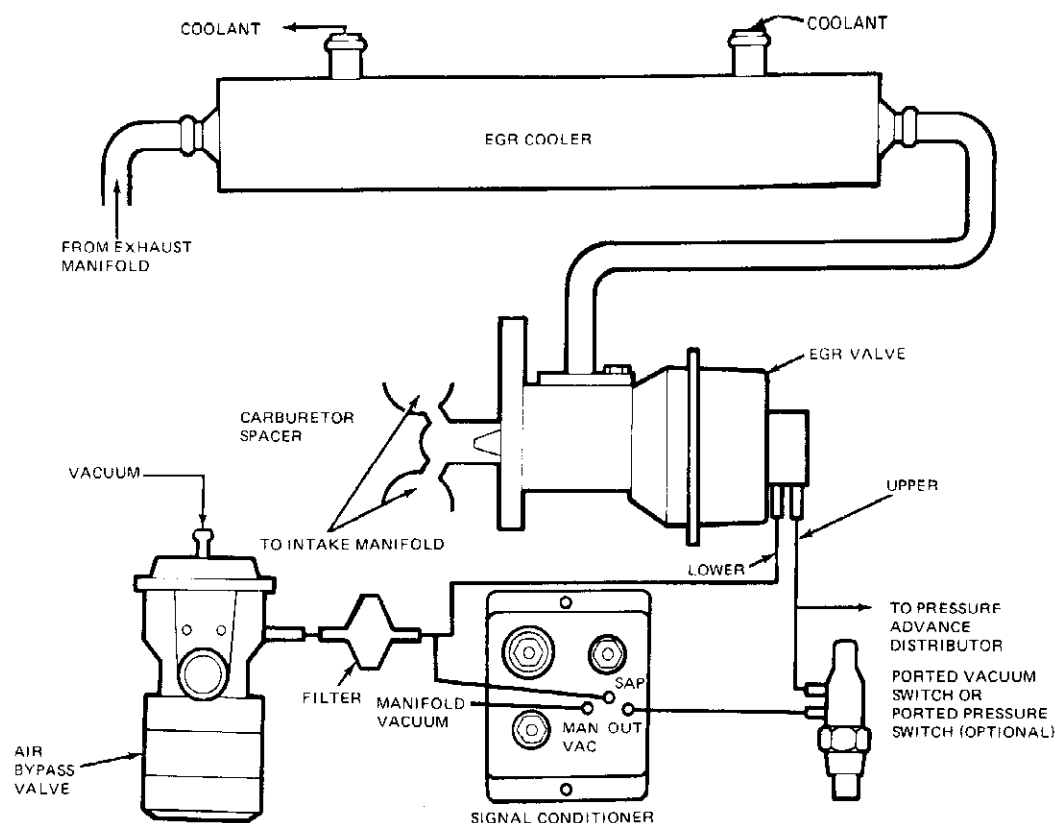


FIG. 38 V.O.A. Pneumatic EGR System

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quality improved when the output line was removed, replace the signal conditioner.

- E. Remove the manifold vacuum line to signal conditioner. The output pressure of the signal conditioner should be less than 1.0 in Hg (0.5 psi).
- F. Increase the engine speed to approximately 2000 rpm, the output should remain at Zero. If not, replace the signal conditioner.
- G. Connect an external vacuum source to the manifold vacuum port of the signal conditioner.
- H. With the engine speed at approximately 2000 rpm, apply 6.0 in Hg vacuum to the manifold vacuum port, observe the output and note the reading. Increase the vacuum signal to 17 in Hg. As the vacuum signal increases the output pressure should remain greater than 1.0 in Hg (0.5 psi). If this does not occur, replace the signal conditioner.

NOTE: Be sure that the vacuum system for the bypass valve is intact and that the valve is not in the bypass mode while performing the above step.

- I. If the signal conditioner has been changed, verify that the original complaint has been resolved. Otherwise, perform further engine diagnosis.
- J. When complaint has been resolved, remove all test equipment and reinstall all vacuum and pressure lines.
- K. Install the air cleaner assembly and torque the wing nut to specification.

III. P.P.S. (Ported Pressure Switch) and P.V.S. (Ported Vacuum Switch) Diagnostic Procedure (if equipped)

- A. Check all pressure hoses in the system to make sure that they are open, not split or cracked, and fit tightly onto the connector.
- B. Verify that the signal conditioner and EGR valve are functioning properly.
- C. Disconnect the pressure hose from the upper connector of the pressure switch and connect a pressure gauge. (An auxiliary pressure of 6 in Hg (3.0 psi) may be used on the lower connector instead of system pressure.)
- D. If necessary, start the engine and warm it to normal operating temperature with the transmission in neutral or park and the parking brake applied.
 1. If no reading is noted on the pressure gauge, the P.P.S. must be replaced.
 2. If a pressure is noted, the P.P.S. is functioning properly. ♦

NOTE: Be sure that the vacuum system for the bypass valve is intact and that the valve is not in the bypass mode while performing the above step.
- E. When complaint has been resolved, remove all test equipment and reinstall the pressure line.
- F. Install the air cleaner assembly and torque the wing nut to specification.

SSD-31 CARBURETOR FEEDBACK SYSTEM

I. Carburetor Feedback Diaphragm Assembly

A. Not Used in 1978

B. Holley Model 6500 Feedback Carburetor

1. With the engine off, disconnect the vacuum hose between the vacuum regulator solenoid valve and the carburetor at the valve. Using an external vacuum source, apply 10 inches Hg vacuum to the hose and note the leakage rate.
2. If the vacuum falls from 10" to 7" Hg within 15 seconds, disconnect the hose and apply vacuum directly to the carburetor. If the leakage rate exceeds the specification, proceed to the next step, otherwise replace the vacuum hose, recheck the vacuum leak rate and proceed to Step 7.
3. Seal the feedback main system diaphragm adjustment screws (with lead plugs on) with your fingers and check the leak rate (see Fig. 42). If the vacuum leak rate now falls within the specified limits, pry open the lead plug on the feedback main system adjustment screw, determine by trial and error the leaking screw, apply Locktite No. 290 or equivalent to the housing threads at the leaking screw, let dry and recheck the leak rate. If the leak rate now falls within the specified limits, install a new lead plug and go to Step 7. Otherwise go to the next step.
4. Disassemble the airhorn and remove the float assembly. Check for the proper torque on the feedback main system diaphragm assembly cover screw (min. 1 in-lb—see Fig. 41). If under the specified limit, tighten the screw to 4-5 in-lb torque and recheck the leak rate. If the leak rate now falls within the specified limits, go to Step 6. Otherwise, go to the next step.
5. Disassemble the main system diaphragm assembly cover screws, examine the sealing surfaces for burrs, nicks, or other types of contamination and repair or clean as required. If the sealing surfaces are suspected as the cause of the complaint, reinstall the original diaphragm assembly (tighten the cover screws to 4-5 in-lb) and check the leak rate. If the leak rate falls within the specified limits, go to Step 6. If the complaint still persists, replace the carburetor with a new carburetor assembly.
6. While applying 5 in Hg vacuum to the feedback diaphragm vacuum source, observe the main diaphragm assembly stem for movement (approximate total stroke must be 0.09 in as the vacuum is applied from 0-5 in Hg). Repair/replace as required. Check the feedback main system metering needle located at the bottom of the fuel bowl for free movement (approximate total stroke from the free to the fully depressed position must be 0.20" (see Fig. 40). Repair/replace as required. Reassemble the float assembly and install the airhorn on the carburetor. If new diaphragm assemblies have been installed, reset the idle F/A mixture using procedure SSD 13.

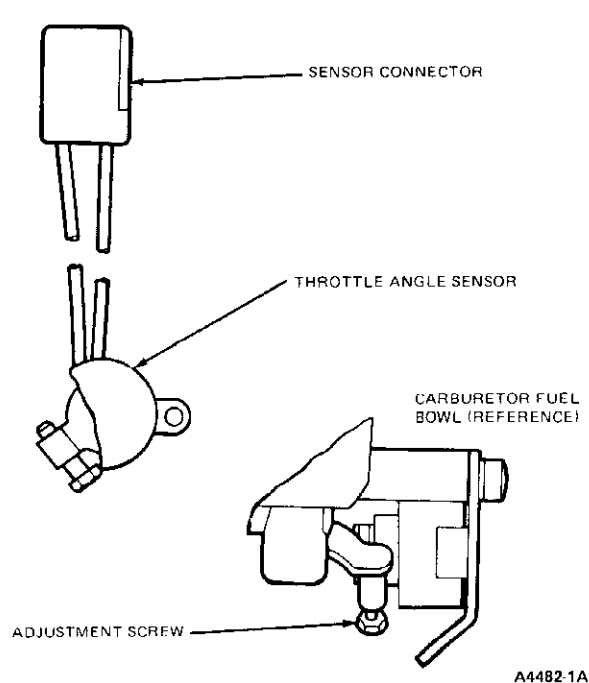


FIG. 39 Throttle Position (TP) Sensor

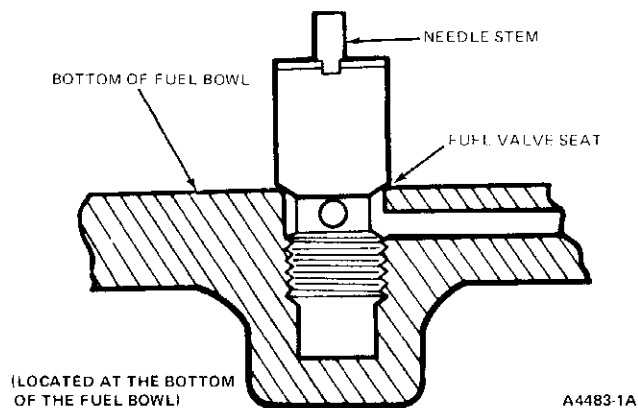


FIG. 40 Feedback Main Metering Needle

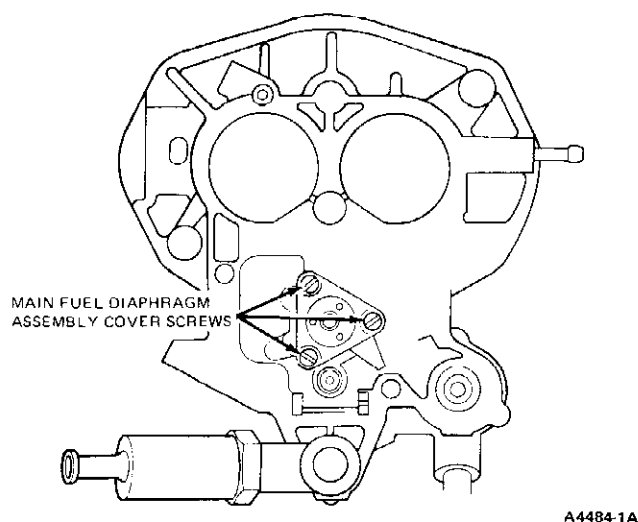


FIG. 41 Airhorn Bottom View—Model 6500 Carburetor

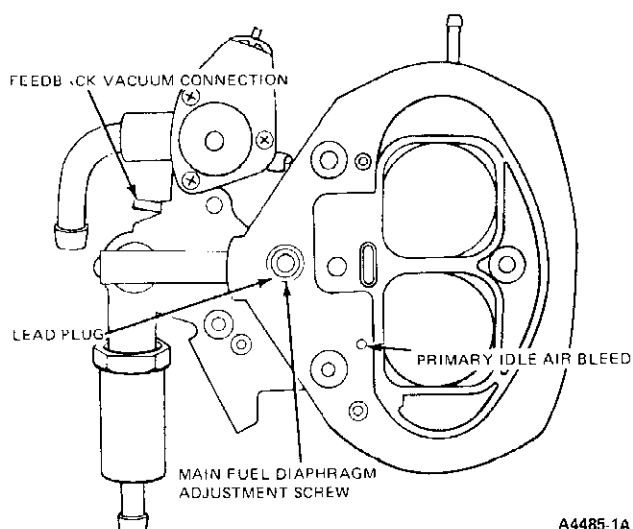


FIG. 42 Airhorn Assembly Top View—Model 6500 Carburetor

Thermactor System

PART
29-03

SUBJECT	PAGE
GENERAL INFORMATION	
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Air Bypass Valves	03-1
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GENERAL INFORMATION

The Thermactor Exhaust Control System (Fig. 1) reduces carbon monoxide and hydrocarbon content of combustion by-product gases, by injecting fresh air into the hot exhaust gas stream as it leaves the combustion chamber. A pump supplies air under pressure to the exhaust port near the exhaust valve, by either an "external" air manifold, or through "internal" drilled-passages in the cylinder head or exhaust manifold. The oxygen in the fresh air, plus the heat of the exhaust gases, causes further oxidation (burning), which converts the exhaust gases into carbon dioxide and water.

Thermactor air may also be injected into the catalytic converter on systems equipped with the Three Way Catalyst (TWC). See Part 29-08.

The major components (Fig. 1 and 2) of a typical Thermactor system include:

- Air supply pump—belt driven from crankshaft pulley or from alternator
- Air bypass valve
- Vacuum differential valve (VDV) with some systems
- Air supply system—external or internal
- Cylinder heads with air passages to exhaust ports
- Air supply check valves
- Vacuum reservoir—some models
- Air supply pump muffler—Mustang II, with 302 CID V-8
- Vacuum Vent Valve (with 2700 Carburetor)

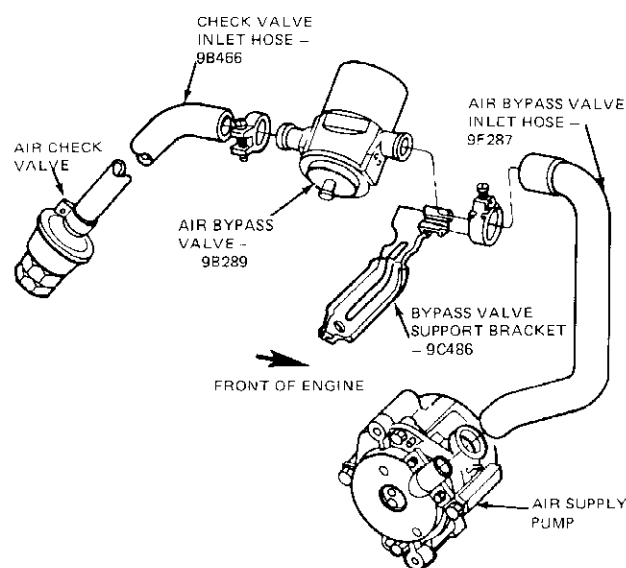
AIR SUPPLY PUMP

The belt driven air pump (Fig. 3) takes air in through an impeller-type centrifugal air filter fan, thus eliminating the need for a separate air filter. Dust and dirt particles cannot enter the pump because these heavier-than-air contaminants are thrown from the air intake by centrifugal force.

The air supply pump does not have a pressure relief valve, this function being controlled by the air bypass valve (Fig. 3).

AIR BYPASS VALVES

Several different types of bypass valves are used (Figs. 4-7). Some are "in line" (connected to the



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FIG. 1 Typical Thermactor System Components

Thermactor air pump with a hose) and some are mounted on the air pump. Both types can be either "timed" or not "timed". Any type bypass valve may be used in a catalyst or non catalyst equipped system.

The timed bypass valve operates as follows: During normal operation, vacuum is equalized on both sides of the diaphragm (Fig. 4). The diaphragm return spring holds the valve closed, allowing thermactor pump air to flow to the exhaust ports.

During deceleration, the sudden rise of intake manifold vacuum under the diaphragm overcomes return spring pressure and pulls the valve downward. Thermactor air is then diverted to the atmosphere momentarily, because vacuum is quickly equalized