

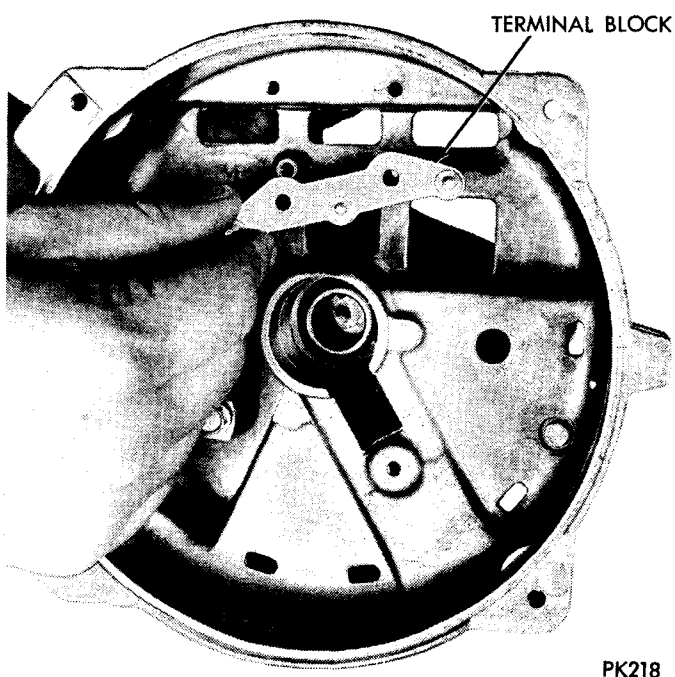
**Fig. 62—Installing Capacitor**

tion over studs on terminal block (Fig. 64).

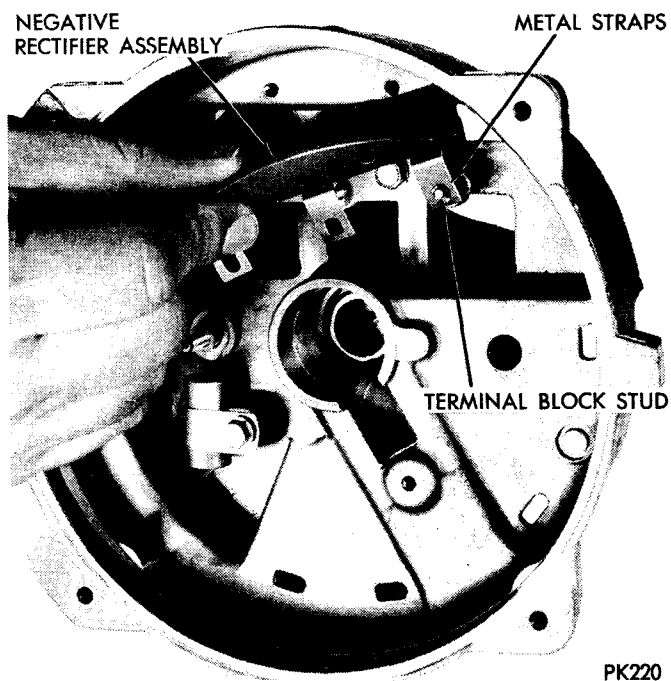
(9) Install negative heat sink mounting screws and tighten securely.

(10) Install insulator on positive heat sink stud, position assembly into place in end shield making sure metal straps properly position over studs on terminal block (Fig. 65).

(11) From inside of end shield install insulator on positive heat sink attaching stud and then install



**Fig. 63—Installing Terminal Block**



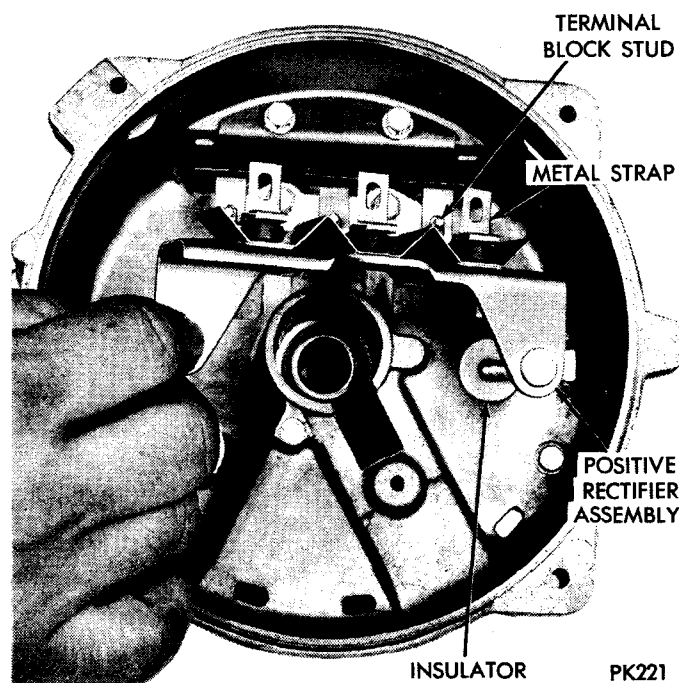
**Fig. 64—Installing Negative Rectifier Assembly**

mounting nut and tighten securely.

(12) From outside of end shield install insulator on positive heat sink stud and then install mounting nut and tighten securely.

(13) Position stator over rectifier end shield and install terminals on terminal block, install and tighten terminal nuts. Route leads so that they cannot contact rotor or sharp edge of negative heat sink.

(14) Position rotor and drive end shield assembly



**Fig. 65—Installing Positive Rectifier Assembly**

over stator and rectifier end shield assembly. Align through bolt holes in rectifier end shield and drive end shield.

(15) Compress stator and both end shields manually and install through bolts. Tighten through bolts evenly to 40-60 inch-pounds torque.

(16) Install field brushes into brush holder, long terminal on bottom, short terminal on top and then install insulators and mounting screw (Fig. 66).

(17) Position brush holder assembly to end shield making sure it is properly seated and tighten mounting screw.

(18) Rotate pulley slowly by hand to be sure that rotor poles do not hit stator winding leads.

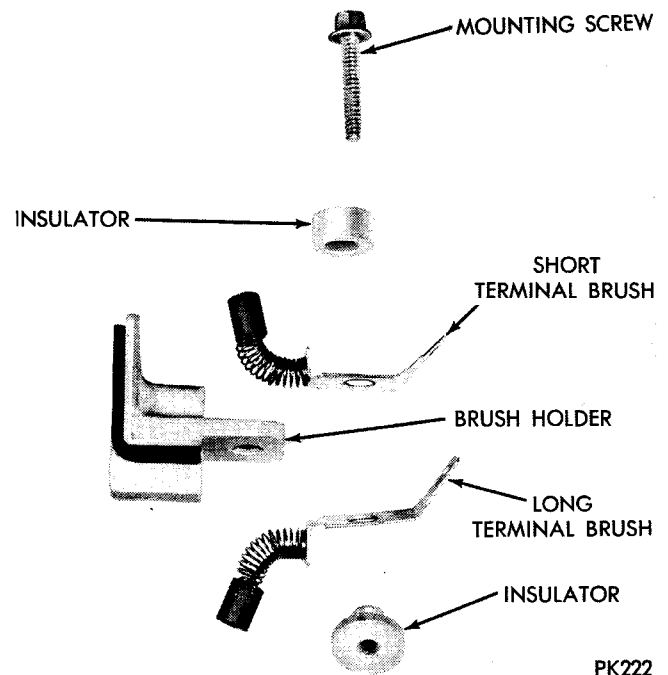
(19) Install alternator and adjust drive belt to specifications.

**CAUTION: DO NOT ADJUST DRIVE BELT WITH ENGINE RUNNING.**

(20) Connect alternator output (BAT), two field (FLD), and ground (GRN) leads. Connect battery ground cable.

(21) Start and operate engine. Observe alternator operation.

(22) Test current output.



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Fig. 66—Assembling Field Brushes

## ELECTRONIC IGNITION SYSTEM

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### GENERAL INFORMATION

All domestic built light and medium duty trucks, models 100-800, are equipped with the Chrysler Electronic Ignition System (Fig. 1) consisting of the battery, ignition switch, dual ballast resistor (Fig. 2), control unit (Fig. 3), coil, distributor (Fig. 4), spark plugs, and all their wiring, insulators, and connectors.

The primary circuit consists of the battery, ignition switch, compensating (0.5 ohm) side of the ballast resistor, primary windings of the ignition coil, power switching transistor of the control unit, and the vehicle frame.

The secondary circuit consists of the coil secondary windings, distributor cap and rotor, spark plug wires, spark plugs, and vehicle frame.

The compensating resistance maintains constant primary current with variation in engine speed. During starting this resistance is by-passed, applying full battery voltage to the ignition coil.

In addition to the two basic circuits there are three other circuits. They are the pick up coil circuit, control unit feed circuit, and auxiliary ballast circuit.

Two circuits are used to operate the circuitry of



the control unit. These are the auxiliary ballast circuit which uses the 5 ohm section of the dual ballast resistor and the control unit feed circuit.

The reluctor rotating with the distributor shaft produces a voltage pulse in the magnetic pickup each time a spark plug should be fired. This pulse is transmitted through the pickup coil to the power switching transistor in the control unit and causes the transistor to interrupt the current flow through the primary circuit. This break in the primary circuit induces a high

The length of time that the switching transistor allows the flow of current in the primary circuit is determined by the electronic circuitry in the control unit. **THIS DETERMINES "DWELL". DWELL IS NOT ADJUSTABLE. THERE IS NO MEANS PROVIDED TO CHANGE IT BECAUSE CHANGES ARE NOT NECESSARY.**

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**Fig. 2—Dual Ballast Resistor**

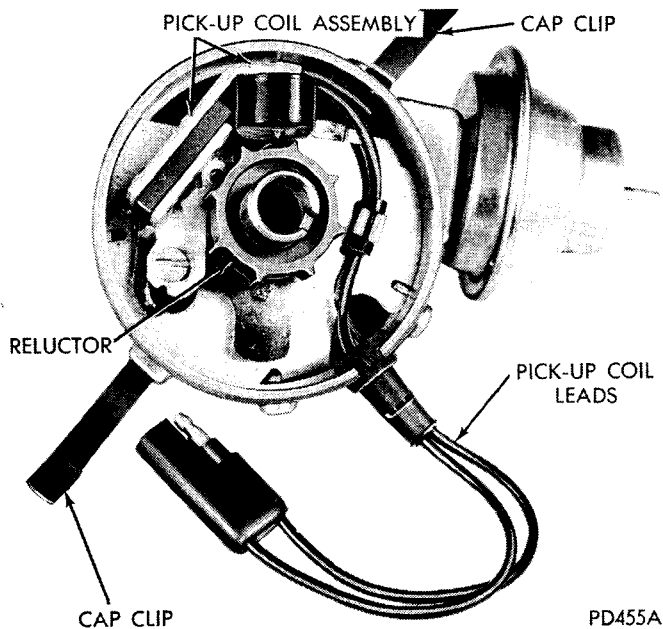


Fig. 4—Electronic Distributor

TER HAS NO SIGNIFICANCE IN DIAGNOSING OR SERVICING THE IGNITION SYSTEM. SINCE DWELL AFFECTS IGNITION TIMING, PERIODIC CHECKS OF TIMING BECOME UNNECESSARY AFTER BASIC IGNITION TIMING IS SET.

Ignition maintenance is reduced to inspection of the distributor cap, rotor, wiring, and the cleaning and changing of spark plugs as needed.

### ELECTRONIC IGNITION TESTS (With Tester Tools)

The ignition system can be tested with either of the following tester tools:

#### C-4166 With C-4166-1 (Fig. 5)

When using tester C-4166 the adapter C-4166-1 must be used.

#### C-4166-A (Fig. 6)

Tester C-4166-A has the adapter circuit built into it. Do not connect adapter C-4166-1 to it. Also this tester has one additional red light and toggle switch for testing the dual ballast resistor when performing on the vehicle system test. It can not be used for off the vehicle, component test.

### On the Vehicle System Test

#### Test Preparation

**Caution:** The vehicle must have a fully charged 12 volt battery (minimum specific gravity 1.220 temperature corrected), for the tester to accurately analyze the ignition system. Do not proceed with test unless battery meets specifications.

(1) With the ignition switch in "OFF" position, re-

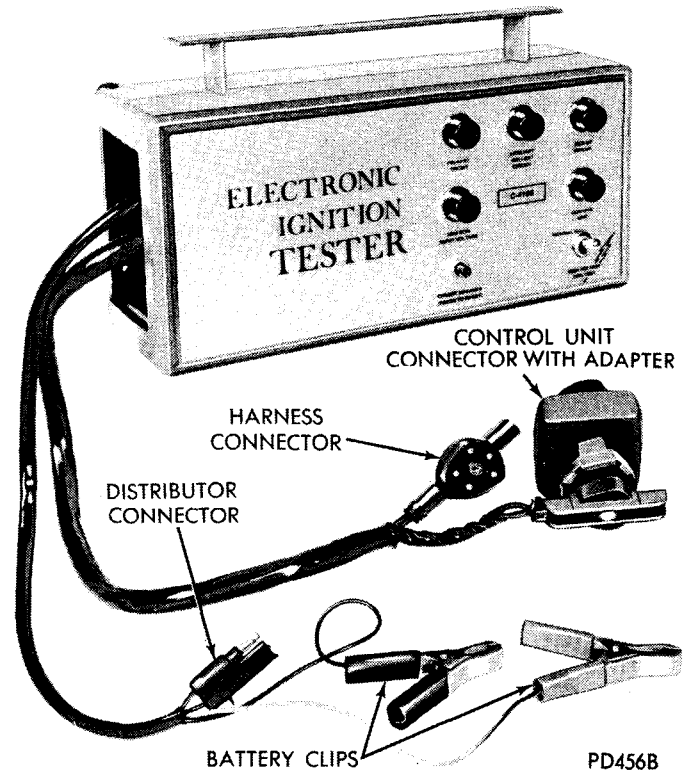


Fig. 5—Tester C-4166 with C-4166-1 Adapter

move screw attaching wiring harness connector to control unit.

(2) Connect female lead of tester wiring harness to control unit and male lead of tester to disconnected lead from control unit. This puts tester into vehicle ignition system.

**CAUTION: DO NOT CONNECT THE BATTERY CLIPS OF TESTER TO VEHICLE OR ANY OTHER BATTERY. DO NOT CONNECT DISTRIBUTOR CONNECTOR OF TESTER TO DISTRIBUTOR LEAD ON VEHICLE. THE BATTERY CLIPS AND DISTRIBUTOR CONNECTOR OF TESTER ARE USED ONLY**

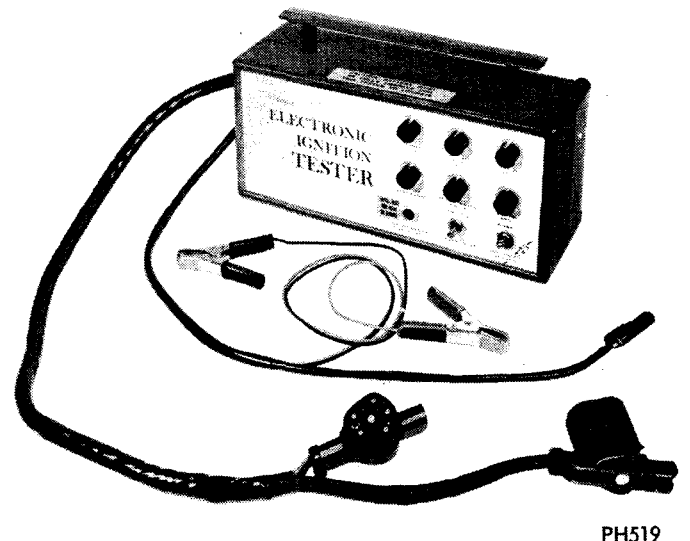
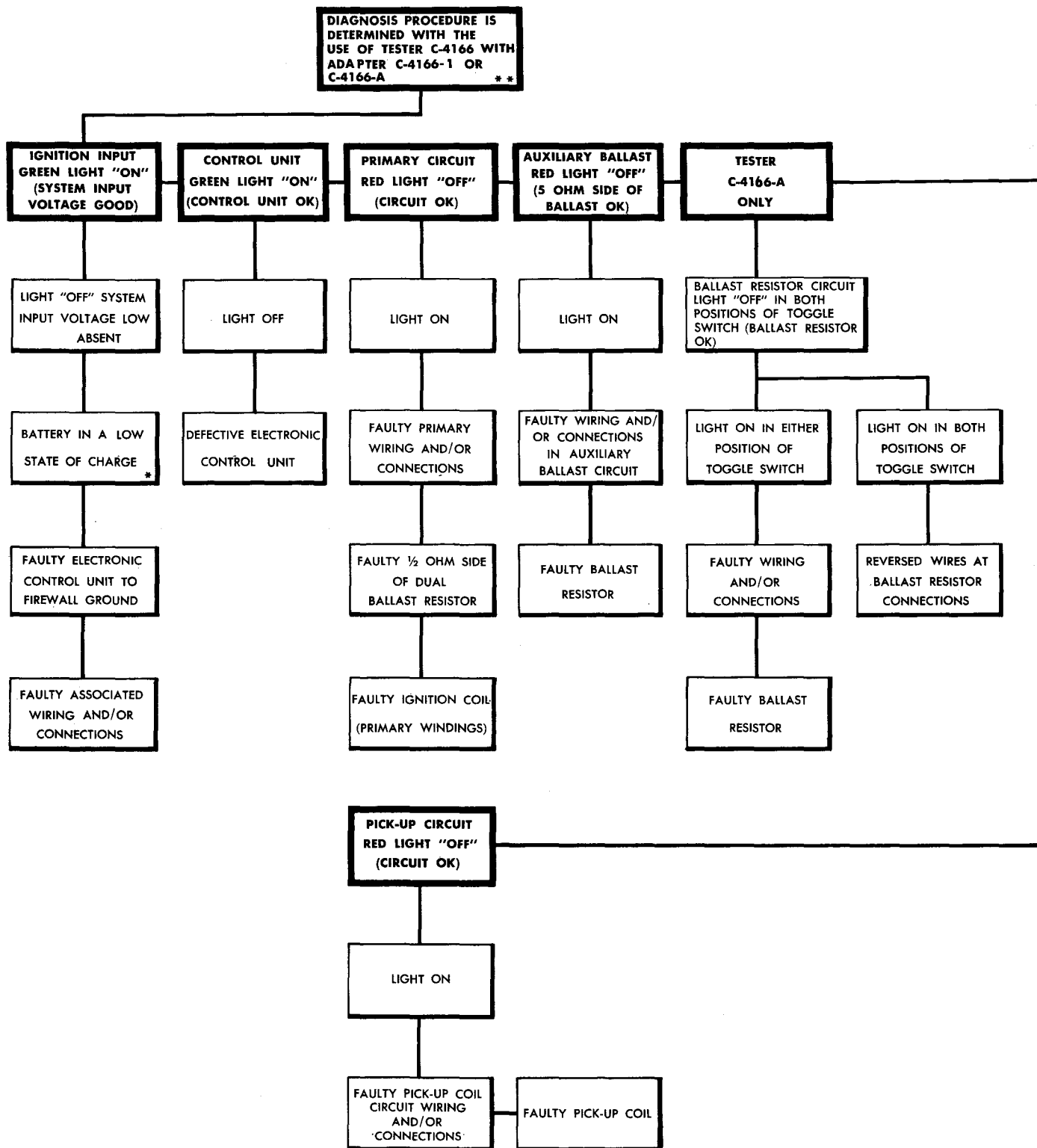
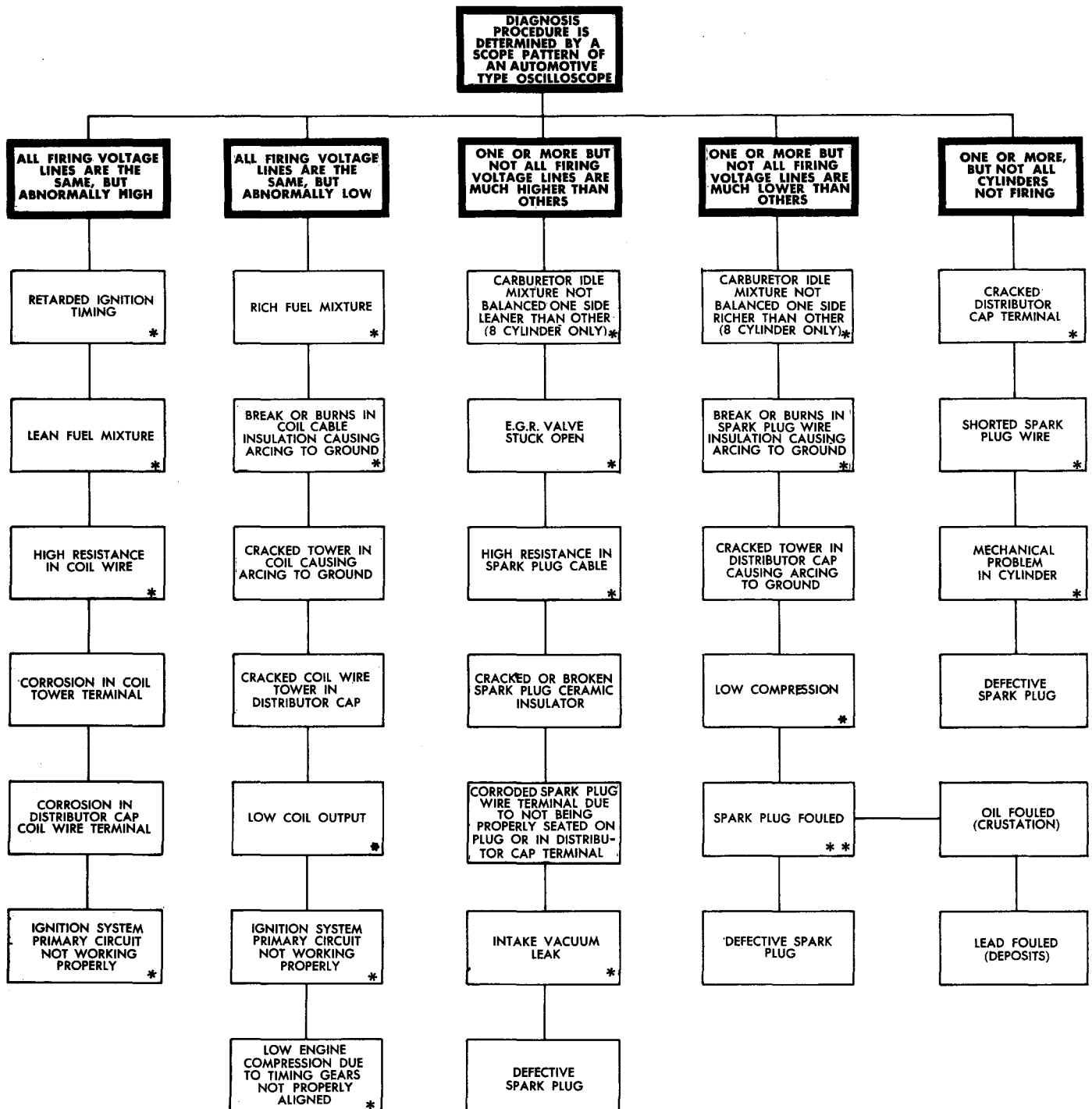


Fig. 6—Tester C-4166A

## ELECTRONIC IGNITION SYSTEM PRIMARY CIRCUIT DIAGNOSIS



# ELECTRONIC IGNITION SYSTEM SECONDARY CIRCUIT DIAGNOSIS



\* ALL TESTS AND REPAIRS ARE DESCRIBED IN APPROPRIATE SECTION OF SERVICE MANUAL.

\*\* SPARK PLUGS (DO NOT FOUL BY THEMSELVES.) CHECK FOR WHAT CAUSED PLUG TO FOUL. INSTALLING NEW SPARK PLUGS WILL NOT CORRECT FOULING CONDITION.

**WHEN TESTING COMPONENTS OFF THE VEHICLE.**

(3) Turn ignition switch to "ON" position.

**Warning:** Do not touch transistor on control unit while ignition switch is on for electrical shock will be obtained.

**Ignition Input Voltage Light**

The green ignition input voltage light must come on before any further tests can be made. If the light does not come on the ignition system input voltage is low or absent. Check vehicle battery, ignition switch, the control unit for a good ground, and the associated wiring and connections until the fault is found, corrected, and the green light comes on.

**Control Unit Light**

The control unit green light must come on to indicate the control unit is functioning properly and that it is properly grounded. If the light does not come on, first check the connector pins on control unit for corrosion, or foreign matter. Then check control unit for a poor ground. If none of these conditions exists and the light still remains off, the control unit is malfunctioning and must be replaced.

**High Voltage Coil Test**

The high voltage coil test must be performed to completely test the ignition system. Proceed only if the ignition input and control unit green lights are both on, and all the red lights are off.

Disconnect ignition coil secondary wire from distributor cap tower. Hold the end of the wire with insulated pliers about 1/4 inch from engine and then actuate the High Voltage Coil Test switch. A good spark should be observed between the wire and the engine. While still holding the coil test switch pull wire away from engine till the spark stops. Closely observe the coil tower during the movement to be sure that no arcing occurs.

**Primary Circuit Light**

The primary circuit red light must be off to indicate that the primary circuit is functioning properly. If the light is on check coil primary windings for continuity or shorts, suppression capacitor for shorts, dual ballast resistor compensating side (1/2 ohm), wiring, and for open or incorrect connections, until fault is found, corrected, and light goes out.

**Auxiliary Ballast Circuit Light**

The auxiliary ballast circuit red light must be off to indicate that the auxiliary ballast circuit is functioning properly. If the light is on first check the wiring, and connections for continuity, corrosion, or shorts. If none of these conditions exists and the light is still on, the dual ballast resistor (auxiliary side) is malfunctioning and must be replaced.

**Pick Up Circuit Light**

**CAUTION:** THE PICK UP COIL CAN BE CHECKED, WITH THE TESTER AT ROOM TEMPERATURE ONLY, 70°-80°F.

IF PICK UP COIL MUST BE TESTED WHEN ENGINE IS AT OPERATING TEMPERATURE, REFER TO "ELECTRONIC IGNITION TEST WITHOUT TESTER", STEP 3A, FOR CORRECT TESTING PROCEDURE.

The pick up circuit red light must be off to indicate that the pick up circuit is functioning properly. If the light is on first check the wiring and connections for continuity, corrosion, or shorts. If none of the conditions exists and the light is still on, the pick up coil is malfunctioning and must be replaced.

**Ballast Resistor Circuit Light (Tester C-4166-A Only)**

The ballast resistor circuit red light must be off when the toggle switch is moved to either the 5 ohm or 1/2 ohm position to indicate that the ballast resistor circuit is functioning properly. If the light comes on in either position, first check wiring and connections for continuity, corrosion or shorts. If none of these conditions exists and the light is still on the dual ballast resistor is malfunctioning and must be replaced. **Note:** If lights come on in both positions, first check for reversed wires at ballast resistor terminals, (1/2 ohm connected to 5 ohm or 5 ohm connected to 1/2 ohm) before replacing ballast resistor.

**Circuit Breaker Switch**

The circuit breaker will protect the tester against damage due to testing a shorted control unit and if the tester is left connected for a period of time in excess of what it takes to test the system. Wait 60 seconds before attempting to reset a popped circuit breaker. Also do not replace control unit unless green control unit light was off **BEFORE** circuit breaker popped.

**Component Tests Off the Vehicle**

Connect battery clips of tester to a fully charged battery. The green ignition input voltage light will come on if the battery is supplying sufficient voltage for testing. If the light does not come on **DO NOT PROCEED WITH TEST** until battery is charged enough to turn on the light.

**Control Unit (Fig. 7)**

The control unit should be tested as a component **OFF THE VEHICLE**. However, in the event it is tested as a component on the vehicle, **MAKE SURE THE CORRECT POLARITY IS FOLLOWED WHEN CONNECTING THE BATTERY LEADS OF TESTER TO BATTERY, BLACK TO NEGATIVE, RED TO POSITIVE. REVERSING THE POLARITY WILL DAMAGE**

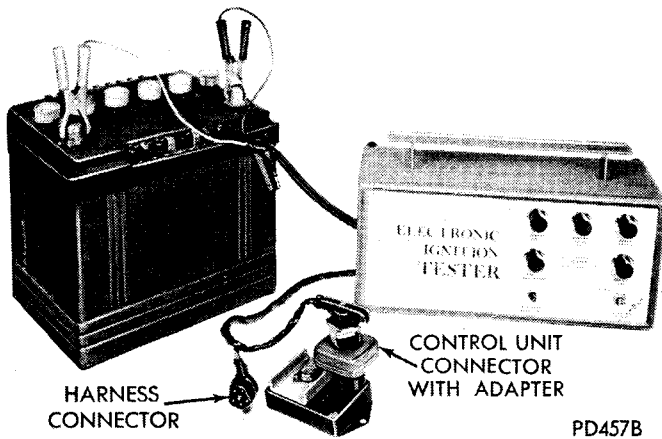


Fig. 7—Testing Control Unit Off Vehicle

#### THE TESTER AND CONTROL UNIT.

Only the ignition input voltage and the control unit lights apply on this test. **Disregard any red lights that may light.**

Connect the wiring harness connector of tester to the control unit. Control unit does not need to be grounded for this test. The control unit green light must come on to indicate a good control unit. If light does not come on check all connector pins for corrosion and security. Check all plug holes to be sure they are clean. If light still does not come on the control unit is defective.

#### Pick-Up Coil (Fig. 8)

The pick-up coil may be tested while assembled in distributor or as a separate unit. Disregard all other lights on the tester except the ignition input circuit light and the pick-up circuit light.

(1) Connect clips to battery and connect the pick-up lead to the proper tester lead. Red pick-up light will be "off" if pick-up is good. Check pick-up lead by flexing it to be sure that there are no intermittent faults in the lead. If pick-up light blinks during flexing the pick-up coil assembly is malfunctioning and must be replaced.

(2) If pick-up light comes "on" replace the pick-up coil assembly.

#### ELECTRONIC IGNITION TEST (without tester)

**NOTE: DO NOT SUBSTITUTE THIS TEST IF TESTERS ARE AVAILABLE.**

To properly test the Electronic Ignition System (Fig. 9), the testers C-4166 with adaptor, C-4166-1 or C-4166-A should be used. But in the event they are not available, the system, may be tested using a voltmeter with a 20,000 ohm/volt rating and an ohmmeter which uses a 1-1/2 volt battery for its operation. Both meters should be in calibration. When Ignition System problems are suspected, the following procedure should be followed:

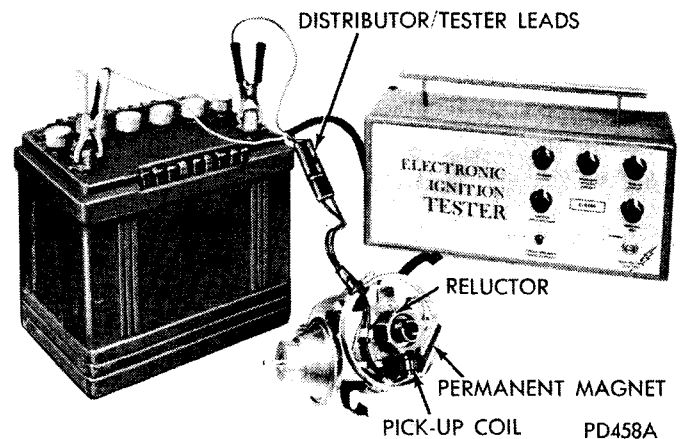


Fig. 8—Testing Pick-Up Coil Off Vehicle

(1) Visually inspect all secondary cables at the coil, distributor and spark plugs for cracks and tightness.

(2) To check wiring harness and connections.

(a) Check primary wire at the ignition coil and ballast resistor for tightness. If the above checks do not determine the problem, the following steps will determine if a **component** is faulty.

(b) Check and note battery voltage reading using voltmeter. Battery voltage should be at least 12 volts.

(c) Remove the multi-wiring connector from the control unit.

**CAUTION: Whenever removing or installing the wiring harness connector to the control unit, the ignition switch must be in the "Off" position.**

(d) Turn the ignition switch "On".

(e) Connect the negative lead of a voltmeter to a good ground.

(f) Connect the positive lead of the voltmeter to the wiring harness connector cavity #1. Available voltage at cavity #1 (Fig. 10) should be within 1 volt of battery voltage with all accessories off. If there is more than a 1 volt difference, Figure 9 shows the circuit that must be checked.

(g) Connect the positive lead of the voltmeter to the wiring harness connector cavity #2. Available voltage at cavity #2 (Fig. 11) should be within 1 volt of battery voltage with all accessories off. If there is more than a 1 volt difference, Figure 11 shows the circuit that must be checked.

(h) Connect the positive lead of the voltmeter to the wiring harness connector cavity #3. Available voltage at cavity #3 (Fig. 12) should be within 1 volt of battery voltage with all accessories off. If there is more than a 1 volt difference, (Fig. 12) shows the circuit that must be checked.

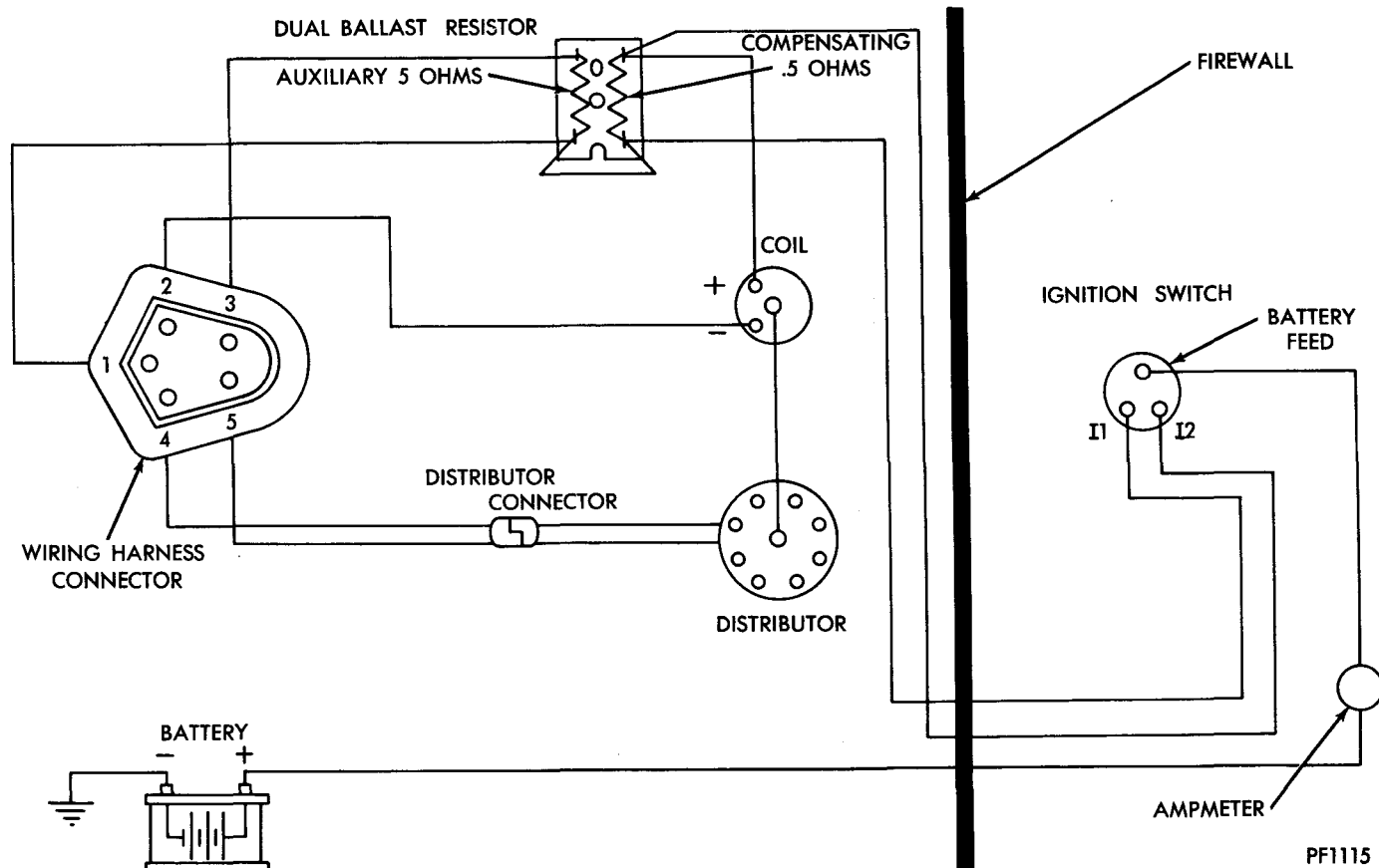
(i) Turn ignition switch "Off".

(3) To check distributor pickup coil

(a) Connect an ohmmeter to wiring harness connector cavity #4 and #5 (Fig. 13). The ohmmeter resistance should be between 150 and 900 ohms.

If the readings are higher or lower than specified,





**Fig. 9—Electronic Ignition System (Wiring Schematic)**

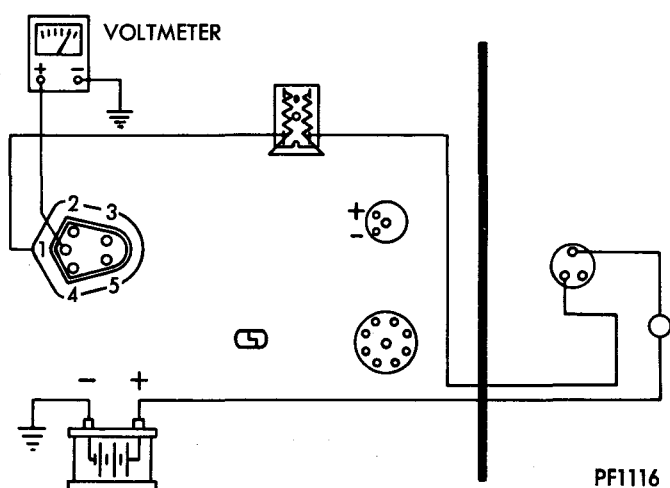
disconnect the dual lead connector coming from the distributor (Fig. 14). Using the ohmmeter, check the resistance at the dual lead connector. If the reading is not between the prementioned resistance values, replace the pickup coil assembly in the distributor.

(b) Connect one ohmmeter lead to a good ground and the other lead to either connector of the distributor. Ohmmeter should show an open circuit. If the ohmmeter does show a reading, the pick up coil in the distributor must be replaced.

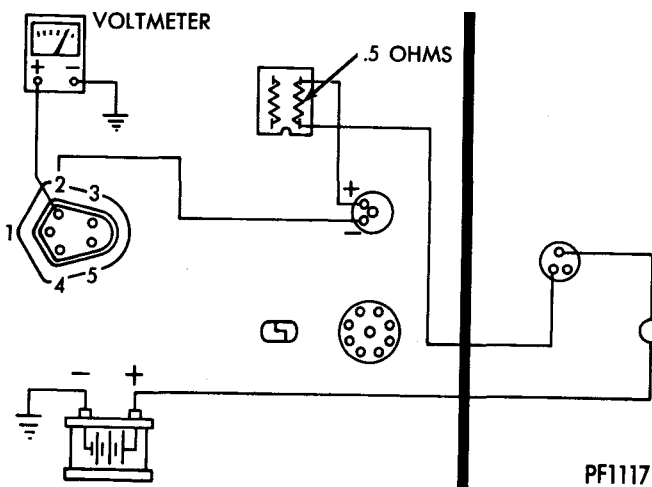
**(4) To check electronic control unit ground circuit**

(a) Connect one ohmmeter lead to a good ground and the other lead to the control unit connector pin #5 (Fig. 15). The ohmmeter should show continuity between the ground and the connector pin. If continuity does not exist, tighten the bolts holding the control unit to the fire wall. Then recheck. If continuity does still not exist, control unit must be replaced.

(5) Reconnect wiring harness at control unit and distributor. **NOTE: Whenever removing or installing**



**Fig. 10—Testing Cavity Number One**



**Fig. 11—Testing Cavity Number Two**

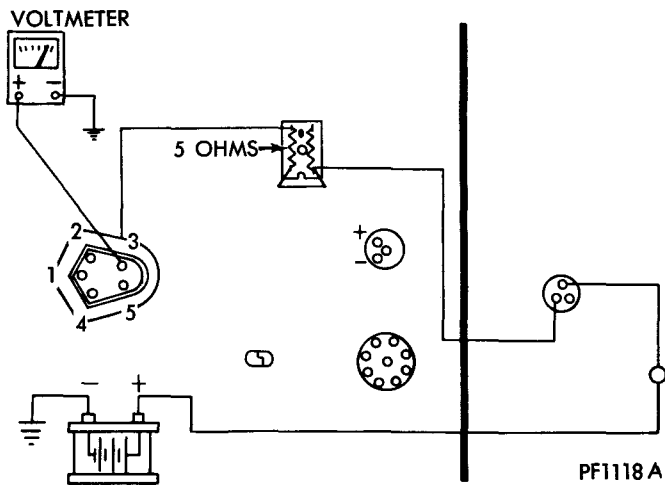


Fig. 12—Testing Cavity Number Three

the wiring harness connector to the control unit, the ignition switch must be in the "Off" position.

(6) Check air gap between reluctor tooth and pick up coil. To set the gap (Fig. 16) refer to "Air Gap Adjustment" under "Service Procedures."

(7) Check ignition secondary

(a) Remove the high voltage cable from the center tower of the distributor. Hold the cable approximately 3/16 inch from engine. Crank engine.

(b) If arcing does not occur, replace the control unit.

(c) Crank the engine again. If arcing still does not occur, replace the ignition coil.

(8) SUMMARY

**Remember:** The electronic ignition tester does a complete job of testing circuits and components. If a problem **does not** show up when making the voltage checks, coil resistance checks, or ground continuity checks it is likely the control unit or coil is faulty. It is unlikely that both units would fail simultaneously. However, before replacing the control unit make sure

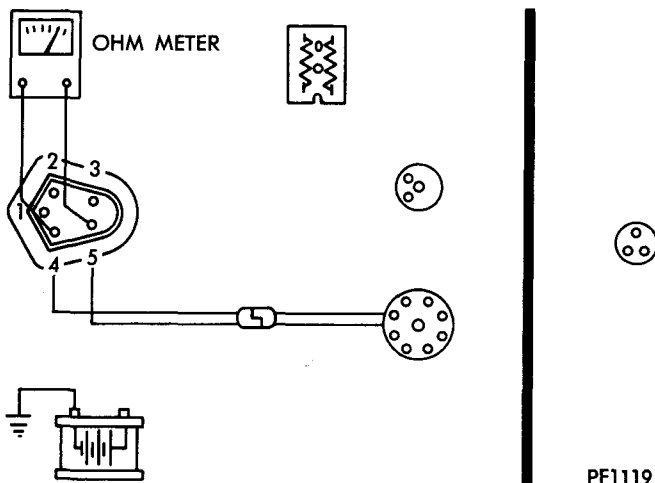


Fig. 13—Testing Pick-Up Coil at Wiring Harness Connector, Cavities Four and Five

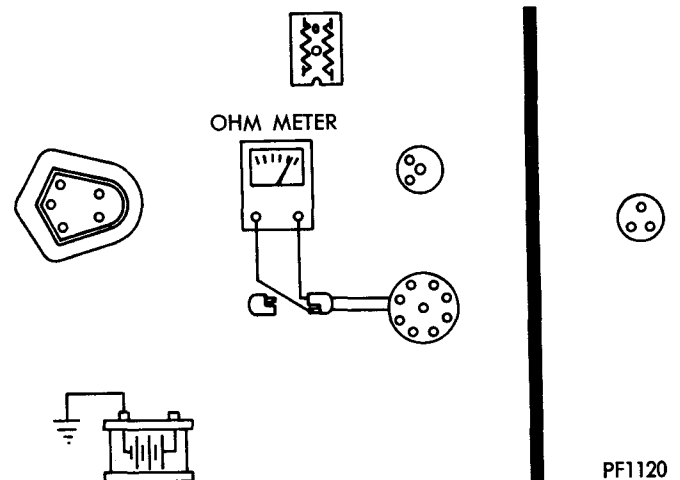


Fig. 14—Testing Pick-Up Coil at Distributor Lead Connector

no foreign matter is lodged in or blocking the female terminal cavities in the harness connector. If clear, try replacing control unit or coil to see which one restores secondary ignition voltage.

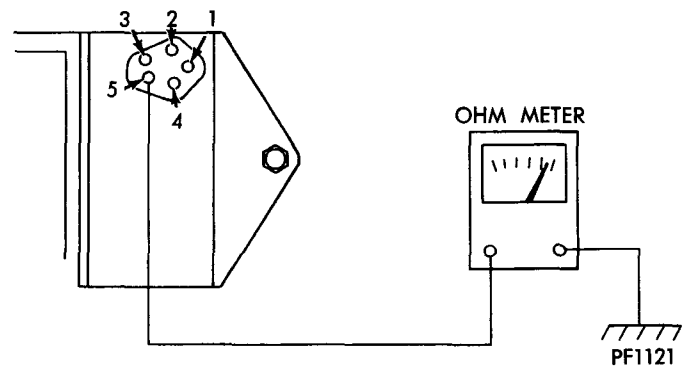


Fig. 15—Testing Ground Circuit

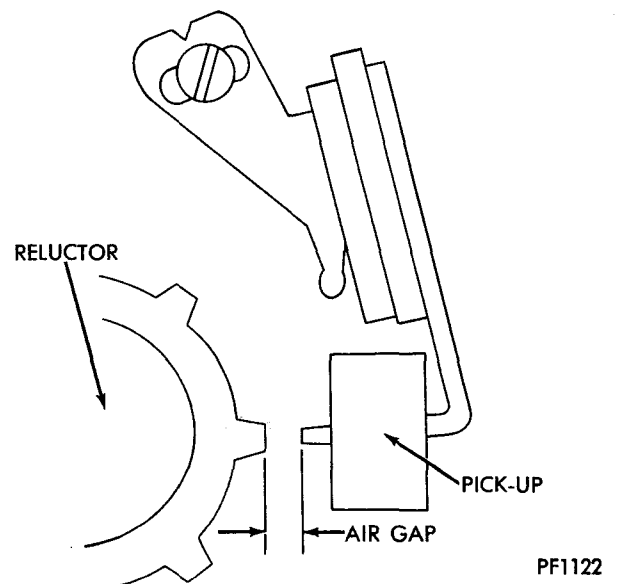


Fig. 16—Air Gap Adjustment

## SERVICE PROCEDURES

**NOTE: ALL PROCEDURES APPLY TO BOTH 6 and 8 CYLINDER ENGINES, EXCEPT WHERE NOTED.**

## SECONDARY CIRCUIT INSPECTION

**Distributor Cap**

Remove wires from towers in cap, one at a time, and inspect for cracks, corrosion, burning, or flashover. If any of these conditions are present, the distributor cap should be replaced.

When installing wires into the towers make sure terminals are fully seated in tower and rubber boots are fully seated around towers. Replace any boot that does not make a good seal.

Remove distributor cap and inspect the inside for flashover, cracking of carbon button, cracking of cap, and burned, worn or grooved terminals. If any of these conditions are present the distributor cap should be replaced.

Light scaling of the terminals, caused by the arcing of the spark from the rotor can be cleaned with a sharp knife. If heavy scaling of the terminals is present, the distributor cap should be replaced.

A cap that is greasy or dirty or has a powdered like substance on the inside should be cleaned with a solution of warm water and a mild detergent. Scrub with a soft brush, thoroughly rinse, and dry with a clean soft cloth.

**Rotor**

Inspect the rotor for cracks, excessive burning of the tip, and proper tension of the spring terminal. If any of these conditions are present the rotor should be replaced.

Light scaling of the tip can be cleaned with a sharp knife, however, if heavy scaling is present the rotor should be replaced.

The rotor can be cleaned with a solution of warm water and a mild detergent. Dry thoroughly before placing back into service.

**Spark Plug Wires**

Check the high tension cable connections for good contact at the coil and distributor cap towers and at the spark plugs. Terminals should be fully seated. The nipples and spark plug covers should be in good condition. Nipples should fit tightly on the coil cap towers and spark plug cover should fit tight around spark plug insulators. Cable connections that are loose will corrode and increase the resistance and permit water to enter the towers causing ignition malfunction. **To maintain proper sealing between the towers and nipples, cable and nipple assemblies should not be removed from the distributor or coil towers unless nipples are damaged or cable testing indicates high resistance or broken insulation.**

Clean high tension cables with a cloth moistened with a non-flammable solvent and wipe dry. Check for brittle or cracked insulation.

When testing secondary cables for punctures and cracks with an oscilloscope follow the instructions of the equipment manufacturers.

If an oscilloscope is not available, secondary cables can be tested as follows:

**CAUTION: ON VEHICLES EQUIPPED WITH CATALYTIC CONVERTER, DO NOT LEAVE ANY ONE SPARK PLUG WIRE DISCONNECTED ANY LONGER THAN NECESSARY OR POSSIBLE HEAT DAMAGE TO CONVERTER WILL OCCUR. TOTAL TEST TIME MUST NOT EXCEED TEN MINUTES.**

(a) Engine not running, connect one end of a test probe to a good ground, other end free for probing.

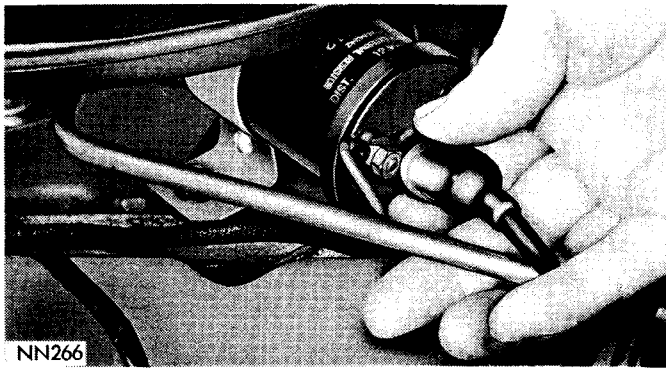
(b) Disconnect cable at spark plug end. Insulate cable end from grounding.

(c) With engine running, move test probe along entire length of wire. If punctures or cracks are present there will be a noticeable spark jump from the faulty area to the probe. Secondary coil wire may be checked in the same manner, be sure one spark plug cable is disconnected from spark plug while running probe along coil wire secondary cable. Cracked, leaking or faulty cables should be replaced.

When installing new cable assemblies, install new high tension cable and nipple assembly over cap or coil tower, entering the terminal into the tower, push lightly, then pinch the large diameter of nipple (Fig. 17) to release trapped air between the nipple and tower. Continue pushing on the cable and nipple until cables are properly seated in the cap towers. Use the same procedure to install cable in coil tower (Fig. 18).



**Fig. 17—Installing Secondary Cable and Nipple at Distributor Cap**



**Fig. 18—Installing Secondary Cable and Nipple at Coil Tower**

**Wipe the spark plug insulator clean before reinstalling cable and cover.**

Use the following procedure when removing the high tension cable from the spark plug. First, remove the cable from the retaining bracket. Then grasp the terminal as close as possible to the spark plug, rotate slightly and use a straight and steady pull. **Do not use pliers and do not pull the cable at an angle.** Doing so will damage the insulation, cable terminal or the spark plug insulator. **Wipe spark plug insulator clean before reinstalling cable and cover.**

Resistance type cable is identified by the words "Electronic Suppression" printed on the cable jacket.

Use an ohmmeter to check resistance type cable for open circuits, loose terminals or high resistance as follows:

- (a) Remove cable from spark plug.
- (b) Lift distributor cap from distributor with cables intact. **Do not remove cables from cap.**
- (c) Connect the ohmmeter between spark plug end terminal and the corresponding electrode inside the cap, making sure ohmmeter probes are in good contact. If resistance is more than 30,000 ohms, remove cable at cap tower and check the cable resistance. If resistance is more than 30,000 ohms on cables under twenty-five inches long or 50,000 ohms on cables over twenty-five inches long, replace cable assembly. Test all spark plug cables in same manner.

To test coil to distributor cap high tension cable, remove distributor cap with the cable intact. **Do not remove cable from the coil or cap.** Connect the ohmmeter between center contact in the cap and either primary terminal at coil. If the combined resistance of coil and cable is more than 25,000 ohms, remove the cable at coil tower and check cable resistance. If resistance is more than 15,000 ohms, replace the cable. If resistance is less, check for a loose connection at the tower or for a faulty coil.

Inspect coil tower for cracks, carbon tracking or oil leaks.

### Spark Plugs

Spark plug appearance or conditions can reflect a wide variety of engine conditions as follows:

#### Normal Conditions

Normal conditions (Fig. 19). This plug has been running at the correct temperature in a "healthy" engine. The few deposits present will probably be light tan or gray in color with most regular grades of commercial gasoline. Electrode burning will not be in evidence; gap growth will average not more than about .001 in./1000 miles. Chances are the plug, as pictured, could be cleaned, the gap electrodes filed, regapped and reinstalled with good results.

#### Cold Fouling

Cold fouling or carbon deposits (Fig. 19). This dry black appearance is fuel carbon and can be due to over rich fuel-air mixture, possibly resulting from a faulty choke, clogged air cleaner, improper carburetor or idle adjustment, or dirty carburetor. However, if only one or two plugs in a set are fouled like this it is a good idea to check for worn or improperly installed valve guide seals, or faulty ignition cables. This condition also results from prolonged operation at idle. If the vehicle is operated extensively at idle and low speeds, improved plug service will be obtained by using the next step hotter spark plugs.

#### Wet Fouling

Wet fouling (Fig. 20) tells you that the plug has drowned in excess oil. In an old engine, suspect worn rings or excessive cylinder wear. Use of a hotter plug may relieve such fouling, but plugs can't take the place of needed engine overhaul. **Remember that "break-in" fouling of new engines may occur before normal oil control is achieved. In new or recently overhauled jobs, such fouled plugs can be cleaned and reinstalled.**

#### Overheating

Overheating (Fig. 20) is indicated by a white or light gray insulator which appears "blistered". Electrode wear rate will be considerably in excess of .001 in./1000 miles. This suggests that a cooler heat range should be used . . . however, over-advanced ignition



**Fig. 19—Normal and Cold Fouling**

timing, detonation and cooling system stoppages can also overheat the **correct** spark plug heat ranges.

### Oil or Oil Ash Incrusted (Fig. 21)

If one or more plugs are oil or oil ash incrustated, the engine should be evaluated for the true cause of oil entry into the combustion chamber.

### High Speed Miss

When replacing spark plugs because of a high speed miss condition; **wide open throttle operation must be avoided for approximately 50 miles after installation of new plugs.**

This will allow deposit shifting in the combustion chamber to take place gradually and avoid plug destroying splash fouling shortly after the plug change.

### Cleaning and Regapping

Carefully clean the spark plugs in an abrasive type cleaner. Use a pin type feeler gauge to check spark plug gap. Reset gaps to .035 inch. **Before setting spark plug gap, file center electrode flat, make adjustment by bending ground (side) electrode, never bend the center electrode.**

When installing spark plugs, refer to specifications for tightening torque.

### IDLE RPM TEST

Engine idle rpm setting should be **tested and recorded as it is when the vehicle is first brought into the shop** for testing. This will assist in diagnosing complaints of engine stalling, creeping and hard shifting on vehicles equipped with automatic transmissions.

Test procedures are as follows:

(1) Connect red lead of the test tachometer unit to the negative primary terminal of the coil and the black lead to a good ground.

(2) Turn selector switch to the appropriate cylinder position of engine being tested (6 or 8 cylinder).

(3) Turn tachometer rpm switch to the 1000 rpm position.

(4) With engine at normal operating temperature (off fast idle), momentarily open the throttle and re-

lease to make sure there is no bind in the linkage and that idle speed screw is against its stop.

(5) Note engine rpm on 1000 rpm scale and adjust curb idle speed to specifications. See "Fuel System" specifications.

**On engines equipped with idle speed solenoids, the solenoid must be energized. Adjust curb idle speeds with the curb idle adjusting screw resting on the solenoid plunger.**

### IGNITION TIMING

To obtain maximum engine performance, the distributor must be correctly positioned on the engine to give proper ignition timing.

The ignition timing test will indicate timing of the spark at number one cylinder.

Test procedures are as follows:

(1) Connect a suitable Power Timing Light to number one cylinder (refer to the equipment manufacturer's instructions for correct connecting procedures). **Do not puncture cables, boots or nipples with test probes. Always use proper adapters. Puncturing the spark plug cables with a probe will damage the cables. The probe can separate the conductor and cause high resistance. In addition breaking the rubber insulation may permit secondary current to arc to ground.**

(2) Start engine and run until operating temperature is obtained.

(3) Set hot idle engine speed. (refer to Specifications under Fuel Systems).

(4) Disconnect vacuum hose at distributor and plug vacuum hose.



Fig. 20—Wet Fouling and Overheating



Fig. 21—Oil or Oil Ash Incrusted

(5) Loosen distributor hold-down arm screw just enough so the distributor housing can be rotated in its mounting.

(6) Aim Power Timing Light at timing plate on chain case cover. If light flash occurs when timing mark on vibration damper is located before specified degree mark on timing plate in the direction of engine rotation, timing is advanced. To adjust, turn distributor housing in direction of rotor rotation.

If flash occurs when the vibration timing mark is located after specified degree mark in the direction of engine rotation, timing is retarded. To adjust turn distributor housing against direction of rotor rotation. Refer to "Specification." (Moving the distributor housing against shaft rotation advances timing and with shaft rotation retards timing).

**Caution: Do not use distributor vacuum advance chamber as a turning handle when turning distributor.**

(7) Tighten distributor hold-down arm screw after timing has been set and recheck timing adjustment with a Power Timing Light.

(8) When ignition timing is correct, reconnect vacuum hose to distributor.

(9) If engine idle speed has changed, readjust curb idle. **DO NOT RESET TIMING.**

## DISTRIBUTOR REMOVAL

### 6 Cylinder

(1) Disconnect vacuum hose at distributor.

(2) Disconnect distributor pickup lead wire at wiring harness connector.

(3) Unfasten distributor cap retaining clips and lift off distributor cap.

(4) Rotate engine crankshaft until the distributor rotor is pointing toward the cylinder block, scribe a mark on block at this point to indicate position of the rotor as reference when reinstalling distributor.

(5) Remove distributor hold down screw.

(6) Carefully lift the distributor from the engine. The shaft will rotate slightly as the distributor gear is disengaged from the camshaft gear.

### 8 Cylinder

(1) Disconnect vacuum hose at distributor.

(2) Disconnect distributor pickup lead wire at wiring harness connector.

(3) Unfasten distributor cap retaining clips and lift off distributor cap.

(4) Scribe a mark on the edge of distributor housing to indicate position of the rotor as reference when reinstalling distributor.

(5) Remove distributor hold down clamp screw and clamp.

(6) Carefully lift distributor from engine.

## DISTRIBUTOR INSTALLATION

### 6 Cylinder

(1) Position distributor in engine. Make certain the rubber O-ring seal is in the groove of distributor shank.

(2) Carefully engage distributor drive gear with camshaft drive gear so that when distributor is installed properly, rotor will be in line with previously scribed line on cylinder block. **If engine has been cranked while distributor is removed, it will be necessary to establish proper relationship between the distributor shaft and Number 1 piston position as follows:**

(a) Rotate the crankshaft until number one piston is at top of compression stroke. Mark on inner edge of crankshaft pulley should be in line with the "O" (TDC) mark on timing chain case cover.

(b) Rotate rotor to a position just ahead of the number one distributor cap terminal.

(c) Lower the distributor into the opening, engaging distributor gear with drive gear on camshaft. With distributor fully seated on engine, rotor should be under the cap number 1 tower with distributor contacts just separating.

(3) Install the distributor cap (make sure all high tension wires "snap" firmly in the cap towers).

(4) Install hold-down arm screw and tighten finger tight.

(5) Connect distributor pickup lead wire at wiring harness connector.

(6) Adjust engine timing to Specification (refer to "Ignition Timing").

### 8 Cylinder

(1) Position distributor in engine. Make sure the rubber O-ring seal is in the groove of distributor housing. Align rotor with marks previously scribed on distributor housing. **Clean top of cylinder block to insure a good seal between distributor base and block.**

(2) Engage tongue of distributor shaft with slot in distributor oil pump drive gear. **If engine has been cranked while distributor is removed, it will be necessary to establish the proper relationship between distributor shaft and No. 1 piston position as follows:**

(a) Rotate crankshaft until number one piston is at top of compression stroke. Mark on crankshaft vibration dampner should be in line with the "O" TDC mark on timing chain case cover.

(b) Rotate rotor to the position of number one distributor cap terminal.

(c) Lower distributor into the opening, connect pick-up coil leads and install distributor cap. Make sure all high tension wires "snap" firm in cap towers. Install distributor hold-down clamp screw. Tighten screw finger tight.

(3) Connect distributor pickup lead wire at wiring harness connector.

(4) Adjust engine timing to Specification (refer to "Ignition Timing").

## SHAFT AND BUSHING WEAR TEST

(1) Remove distributor (refer to "Distributor Removal").

(2) Remove distributor rotor.

(3) Clamp distributor in a vise equipped with soft jaws and apply only enough pressure to resist any movement of the distributor during the test.

(4) Attach a dial indicator to distributor housing so indicator plunger arm rests against reluctor.

(5) Place one end of a wire loop around the reluctor sleeve just above the reluctor.

(6) Hook a spring scale in the other end of the wire loop.

**Note:** The wire loop must be down against the top of the reluctor to insure a straight pull; also be sure that the wire loop does not interfere with the indicator or indicator holding bracket.

(7) Apply a one pound pull toward the dial indicator and a one pound pull away from the indicator and read the total movement of the plunger on the indicator dial. If the total indicator plunger movement exceeds .006 inch, replace the distributor housing or shaft assembly, (refer to "Distributor Disassembly").

## DISTRIBUTOR DISASSEMBLY

### 6 Cylinder (Fig. 22)

(1) Remove distributor rotor.

(2) Remove the two screws and lockwashers attaching the vacuum control unit to distributor housing, disconnect the vacuum control arm from upper plate, and remove control.

(3) Remove reluctor by prying up from the bottom of the reluctor with two pry bars, or screwdrivers (maximum width 7/16 inch). Be careful not to distort or damage the teeth on the reluctor.

(4) Remove two screws and lockwashers attaching the lower plate to the housing and lift out the lower plate, upper plate, and pick-up coil as an assembly. **Distributor cap clamp springs are held in place by peened metal around the openings and should not be removed.**

(5) If the side play exceeds .006 inch in "Shaft and Bushing Wear Test", replace distributor housing assembly or shaft and governor assembly as follows:

(a) Remove distributor drive gear retaining pin and slide gear off end of shaft. If gear is worn or damaged see "Assembling-Distributor" step 5.

**CAUTION:** Support hub of gear in a manner that pin can be driven out of gear and shaft without damaging gear teeth.

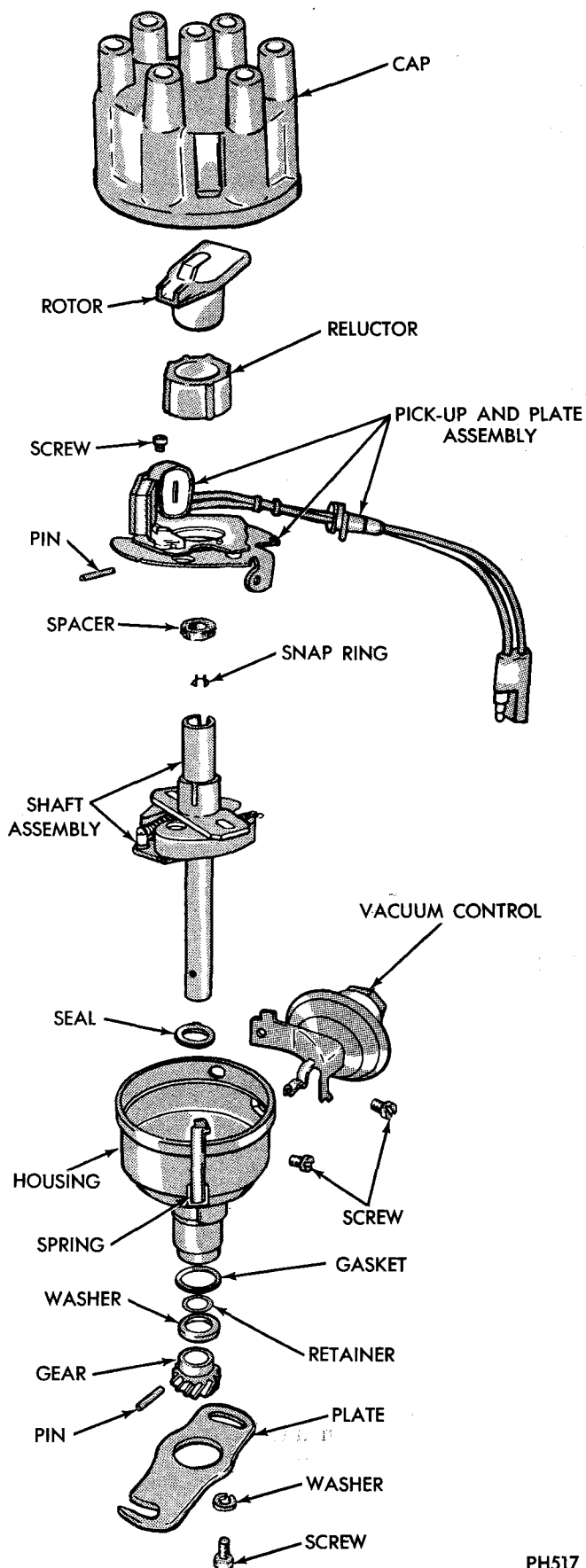


Fig. 22—6 Cylinder Distributor (Exploded View)

- (b) Use a file to clean burrs, from around pin hole in the shaft and remove the lower thrust washer.
- (c) Push the shaft up and remove shaft through top of distributor body.

### 8 Cylinder (Fig. 23)

- (1) Remove distributor rotor.
- (2) Remove the two screws and lockwashers attaching the vacuum control unit to distributor housing, disconnect the vacuum control arm from upper plate, and remove control.
- (3) Remove reluctor by prying up from the bottom of the reluctor with two pry bars, or screwdrivers (maximum width 7/16 inch). Be careful not to distort or damage the teeth on the reluctor.
- (4) Remove two screws and lockwashers attaching the lower plate to the housing and lift out the lower plate, upper plate, and pick-up coil as an assembly.

**Distributor cap clamp springs are held in place by peened metal around the openings and should not be removed.**

If side play exceeded .006 inch in "Shaft and Bushing Wear Test," replace housing or shaft, reluctor sleeve, and governor weights as an assembly as follows:

- (a) Remove distributor shaft retaining pin and slide retainer off end of shaft.
- (b) Use a file to clean burrs, from around pin hole in the shaft and remove the lower thrust washer.
- (c) Push shaft up and remove shaft through top of distributor body.

### ASSEMBLING THE DISTRIBUTOR

#### 6 Cylinder (Refer to Fig. 22)

- (1) Test operation of governor weights and inspect weight springs for distortion.
- (2) Lubricate governor weights.
- (3) Inspect all bearing surfaces and pivot pins for roughness, binding or excessive looseness.
- (4) Lubricate and install upper thrust washer (or washers) on the shaft and slide the shaft into the distributor body.
- (5) If gear is worn or damaged, replace as follows:
  - (a) Install lower thrust washer and old gear on lower end of shaft and temporarily install rollpin.
  - (b) Scribe a line on the end of the shaft from center to edge, so line is centered between two gear teeth as shown in (Fig. 24). **Do not Scribe completely across the shaft.**
  - (c) Remove rollpin and gear. Use a fine file to clean burrs from around pin hole.
  - (d) Install new gear with thrust washer in place. Drill hole in gear and shaft approximately 90 degrees from old hole in shaft and with scribed line centered between the two gear teeth as shown.

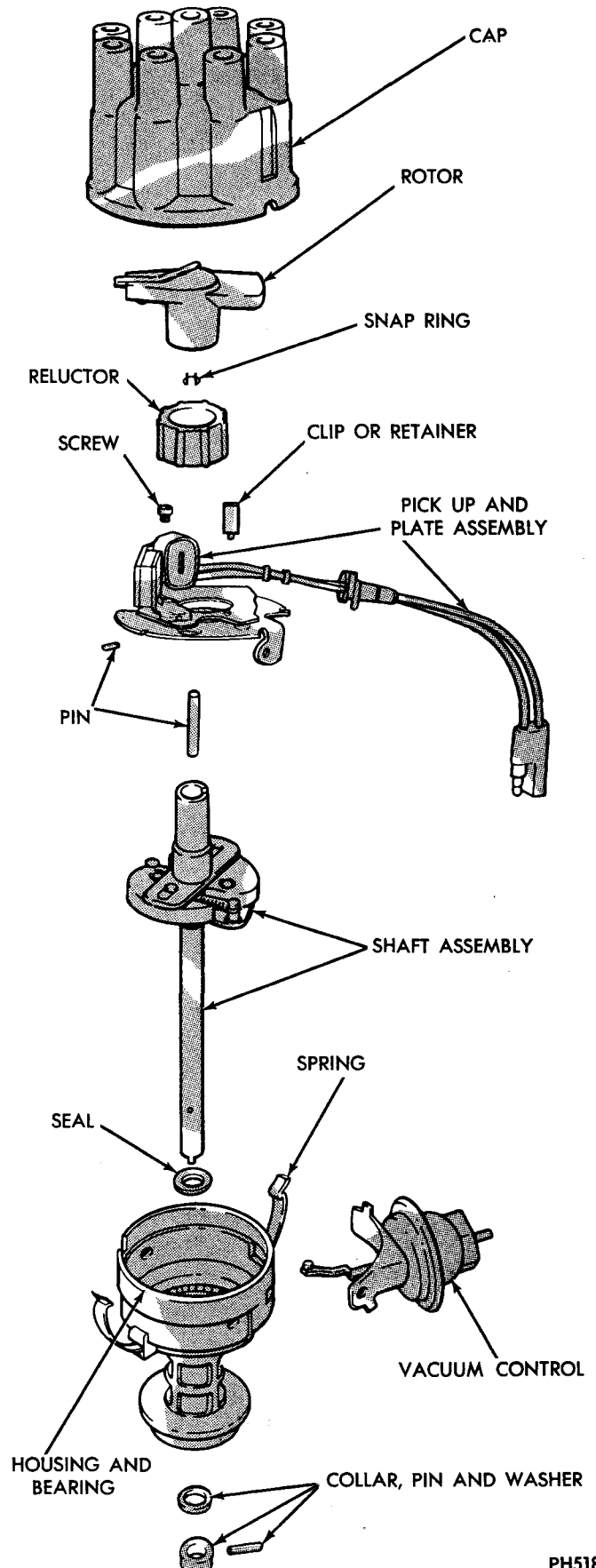


Fig. 23—8 Cylinder Distributor (Exploded View)



(e) Before drilling through shaft and gear, place a .007 feeler gauge between gear and thrust washer and after again observing that the centerline between two of the gear teeth is in line with centerline of rotor electrode (Fig. 25) drill a .124-129 inch hole and install the rollpin.

**CAUTION: Support hub of gear when installing roll pin so that gear teeth will not be damaged.**

(6) Install lower plate, upper plate and pick-up coil assembly and install attaching screws.

(7) Attach vacuum advance unit arm to the pick-up plate.

(8) Install vacuum unit attaching screws and washers.

(9) Position reluctor keeper pin into place on reluctor sleeve.

(10) Slide reluctor down reluctor sleeve and press firmly into place.

(11) Lubricate the felt pad in top of reluctor sleeve with 1 drop of light engine oil and install the rotor.

### 8 Cylinder

(Refer to Fig. 23)

(1) Test operation of governor weights and inspect weight springs for distortion.

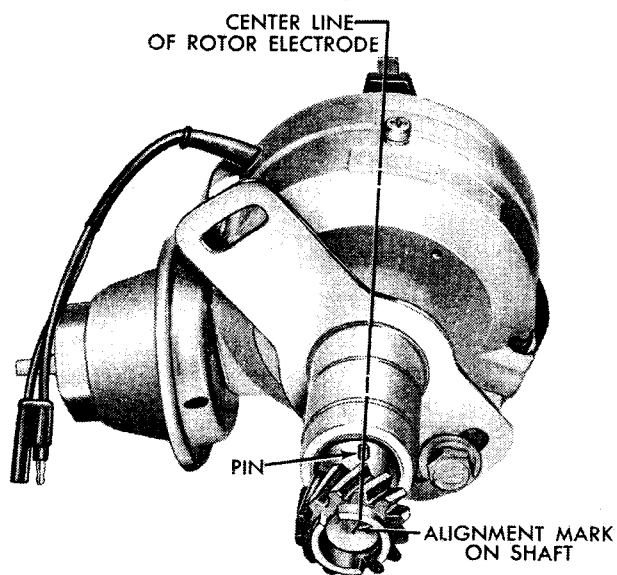
(2) Lubricate governor weights.

(3) Inspect all bearing surfaces and pivot pins for roughness, binding or excessive looseness.

(4) Lubricate and install upper thrust washer (or washers) on the shaft and slide the shaft into the distributor body.

(5) Install distributor shaft retainer and pin.

(6) Install lower plate, upper plate and pick-up coil assembly and install attaching screws.



NP895B

Fig. 24—Scribe Line on Distributor Shaft

(7) Attach vacuum advance unit arm to the pick-up plate.

(8) Install vacuum unit attaching screws and washers.

(9) Position reluctor keeper pin into place on reluctor sleeve.

(10) Slide reluctor down reluctor sleeve and press firmly into place.

Install reluctor so that the two arrows are on top. In a clockwise distributor, the arrow at the keeper pin that holds the reluctor in place should point clockwise. In a counterclockwise distributor, the arrow at the keeper pin should point counterclockwise. If the arrow at the keeper does not point in the direction of the distributor rotation, remove the reluctor, turn it one hundred-eighty degrees (180°) and reinstall it. When removing the reluctor, be careful not to lose the keeper pin.

**CAUTION: Some reluctors may have only one arrow which points in a clockwise direction. On a clockwise rotation distributor the arrow should be next to the keeper pin. In a counter clockwise rotation distributor the arrow should be opposite or 180° away from the keeper pin.**

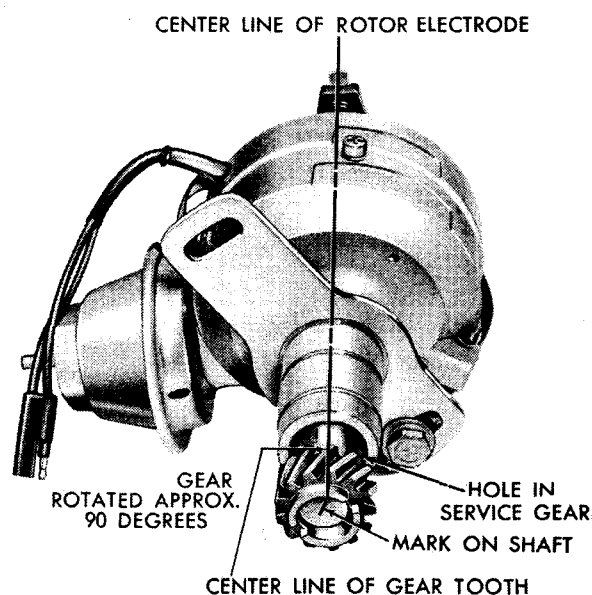
(11) Lubricate the felt pad in top of reluctor sleeve with 1 drop of light engine oil and install the rotor.

### PICK UP COIL REPLACEMENT

#### Removal

(1) Remove distributor.

(2) Remove reluctor by prying up from bottom with two pry bars or screw drivers (maximum width 7/16 inch).



NP896B

Fig. 25—Aligning Gear Teeth With Center Line of Rotor Electrode

**CAUTION: BE CAREFUL NOT TO DAMAGE RELUCTOR TEETH.**

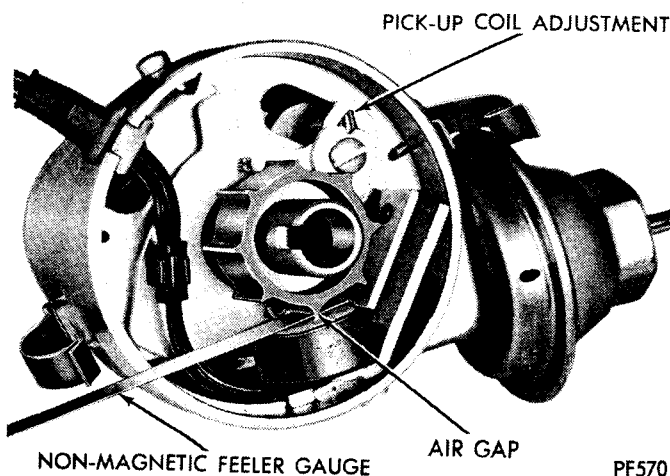
- (3) Remove two screws attaching vacuum control unit to distributor housing.
  - (4) Disconnect vacuum control arm from upper plate and remove control unit.
  - (5) Remove pick up coil leads from distributor housing.
  - (6) Remove two screws attaching lower plate to distributor housing.
  - (7) Lift out lower plate, upper plate, and pick up as an assembly from housing.
  - (8) Remove upper plate and pick up coil assembly from lower plate by depressing retainer clip on underside of lower plate and moving it away from attaching stud.
- Note:** Pick up coil is not removable from upper plate. They are serviced as an assembly.

**Installation**

- (1) Place a small amount of distributor cam lubricant on upper plate support pins located on lower plate.
- (2) Position upper plate on lower plate, install retainer clip, depress and lock into place.
- (3) Position lower plate, upper plate and pick up coil assembly in distributor housing, install mounting screws and tighten securely.
- (4) Attach vacuum control arm to upper plate, position control into place on distributor housing, install mounting screws and tighten securely.
- (5) Install pick up coil leads to distributor housing.
- (6) Install reluctor. Refer to "Assembling the Distributor" for correct installation procedures.
- (7) Install distributor.

**AIR GAP ADJUSTMENT (Fig. 26)**

- (1) Align one reluctor tooth with pick up coil tooth.
- (2) Loosen pick up coil hold down screw.



**Fig. 26—Air Gap Adjustment**

- (3) Insert .006 non-magnetic feeler gauge between reluctor tooth and pick up coil tooth.
- (4) Adjust air gap so that **contact** is made between reluctor tooth, feeler gauge, and pick up coil tooth.
- (5) Tighten hold down screw.
- (6) Remove feeler gauge. **Note: No force should be required** in removing feeler gauge.
- (7) Check air gap with .008 feeler gauge. A .008 feeler gauge should not fit into air gap. **Caution:** A .008 feeler gauge can be forced into air gap. **DO NOT FORCE FEELER GAUGE INTO AIR GAP.**
- (8) Apply vacuum to vacuum unit and rotate governor shaft. Pickup pole should not hit reluctor teeth. Gap was not properly adjusted if hitting occurs. If hitting occurs on only one side of reluctor the distributor shaft is probably bent. Replace governor and shaft assembly.

**CENTRIFUGAL ADVANCE CURVE**

Carefully mount distributor assembly (less cap and rotor) in a reliable stroboscope-type distributor tester.

It is important that the **appropriate adapter** for checking electronic type distributors is connected to the distributor stand and that the instructions for its usage are followed. After this is done proceed with test as follows:

- (1) Turn the selector switch to the 6 or 8 cylinder position and motor switch to the correct direction of rotation. Refer to Distributor Specifications for proper rotation.
- (2) Regulate tester speed control to operate distributor at 200 distributor rpm.
- (3) Align the "O" of distributor tester degree with any of the arrow flashes.
- (4) Adjust tester speed control to operate distributor at speeds called for under "Specifications" and observe arrow flashes opposite tester degree ring to determine degrees of advance.
- (5) If advance is not according to specifications, replace with correct distributor shaft assembly (shaft, reluctor sleeve, governor weights as a complete assembly).

**VACUUM DIAPHRAGM LEAK TEST**

With distributor mounted in distributor tester with vacuum unit attached to distributor, proceed as follows:

- (1) Place thumb over end of vacuum pump and hose and adjust regulator control knob to give a reading of 20 inches with hose closed off to be sure tester hose does not leak.
- (2) Attach tester vacuum pump hose to the tube on the distributor vacuum unit. The vacuum gauge should hold on maximum vacuum obtainable if no leak exists.

(3) Observe contact plate while performing leak test to test response of contact plate. There should be instant response to the pull of the diaphragm, moving the plate without a drag or bind.

(4) If leakage is indicated, replace vacuum unit assembly.

### VACUUM ADVANCE CURVE

Connect tester vacuum pump hose to the distributor vacuum advance unit and perform operations 1 through 3 under "Centrifugal Advance Curve." Then proceed as follows:

(1) Turn tester vacuum pump "ON." Adjust vacuum pump regulator to vacuum test specifications. See "Specifications" and observe arrow flashes on tester degree ring to determine degrees of advance.

(2) If vacuum advance is above or below specifications, replace vacuum advance unit. Retest vacuum advance curve.

### IGNITION COIL

The ignition coil is designed to operate with an external ballast resistor. When testing the coil for output, include resistor in tests. Inspect the coil for external leaks and arcing.

Test coil according to coil tester Manufacturer's instructions. Test coil primary resistance. Test ballast resistor resistance. Test coil secondary resistance. Replace any coil or ballast resistor that does not meet specifications.

Every time an ignition coil is replaced because of a

burned tower, carbon tracking, or any evidence of arcing at the tower, the nipple or boot on the coil end of the secondary cable, replace cable. Any arcing at the tower will carbonize the nipple so that placing it on a new coil will invariably cause another coil failure.

If secondary cable shows any signs of damage, cable should be replaced with a new cable with a neoprene nipple since the old cable can cause arcing, and therefore, ruin a new coil.

### DUAL BALLAST RESISTOR

The normal side of the dual ballast resistor is a compensating resistance in the ignition primary circuit. During low speed operation current is maintained in this side of the ballast resistor for a longer period of time, causing it to heat up, and resistance to increase. This action reduces voltage in the ignition primary circuit, thereby, protects the coil from high voltage during low speed operation. As engine speed is increased the amount of time in which current is maintained in this side of the ballast resistor is shortened, causing it to cool off, and resistance to decrease. This action raises voltage in the ignition primary circuit, which is required for high speed operation. During starter operation the normal side of the dual ballast resistor is bypassed, allowing full battery voltage to the ignition primary circuit. The auxiliary side of this dual unit protects the control unit by limiting voltage to the electronic part of the ignition primary circuit.

## SERVICE PROCEDURES

### HOLLEY

#### GENERAL INFORMATION

The Holley distributor (Fig. 27) has been redesigned to adapt to the electronic ignition system. It functions the same as Chrysler built electronic distributors (Fig. 28) and in addition it acts as an engine speed control unit which is governed by a control valve built into the lower part of the distributor. Also an engine tachometer drive adapter is incorporated in the distributor housing.

#### DISTRIBUTOR REMOVAL

- (1) Remove distributor cap.
- (2) Disconnect pick-up coil lead from wiring harness connector.
- (3) Disconnect vacuum advance hose.
- (4) Disconnect inlet and outlet lines to governor valve.
- (5) Disconnect tachometer drive cable.
- (6) Scribe a mark on engine to where rotor electrode is pointing.

- (7) Remove distributor hold down bolt and clamp.

- (8) Remove distributor from engine by pulling upwards.

#### DISTRIBUTOR INSTALLATION

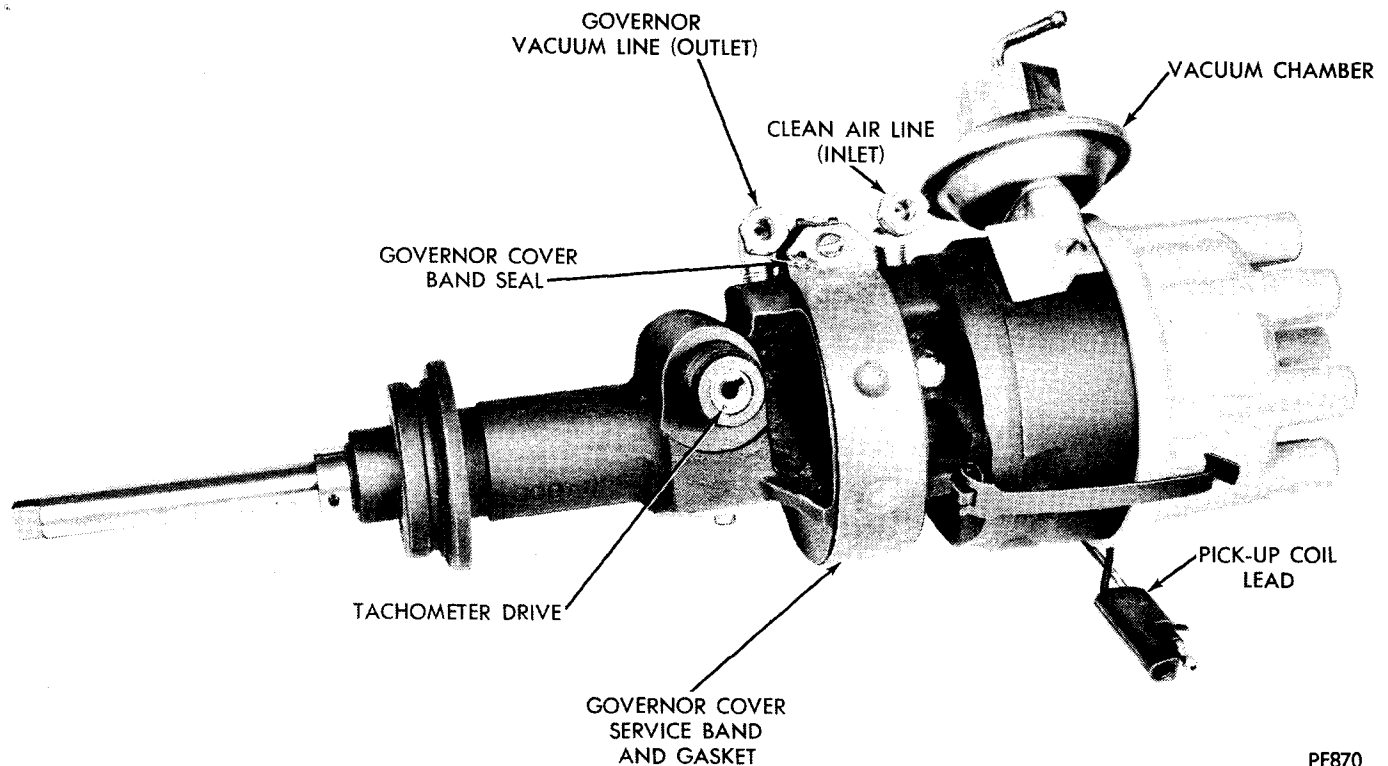
- (1) Position distributor rotor to previously scribed mark on engine.

(2) Engage tongue of distributor shaft with slot in distributor and oil pump drive gear. If engine has been cracked while distributor was removed, it will be necessary to establish proper relationship between distributor shaft and number 1 cylinder as follows:

- (a) Rotate crankshaft until number one piston is at top of compression stroke.

- (b) Rotate rotor to position of number one distributor cap terminal.

- (c) Lower distributor into opening, engage tongue of distributor shaft with slot in distributor and oil pump drive gear.



**Fig. 27—Holley Distributor**

PF870

- (3) Install distributor hold down clamp and bolt. Tighten bolt finger tight.
- (4) Install tachometer drive cable.
- (5) Connect inlet and outlet lines to governor valve.
- (6) Connect pick-up lead wires to wiring harness connector.
- (7) Install distributor cap.
- (8) Set ignition timing.

## DISTRIBUTOR DISASSEMBLY

- (1) Remove distributor.
  - (2) Remove distributor rotor.
  - (3) Remove two screws attaching vacuum chamber to distributor housing.
  - (4) Disconnect vacuum chamber arm from upper plate and remove chamber.
  - (5) Remove reluctor by prying up from bottom with two pry bars or screw drivers (maximum width 7/16 inch).
- CAUTION:** Be careful not to distort or damage teeth or reluctor.
- (6) Detach pick-up coil leads from distributor housing.
  - (7) Remove two screws and lockwashers attaching lower plate to housing and lift out lower plate, upper plate, and pick-up coil as an assembly (Fig. 29).
  - (8) From inside reluctor shaft well; remove the felt wick and with a small hook or screwdriver remove

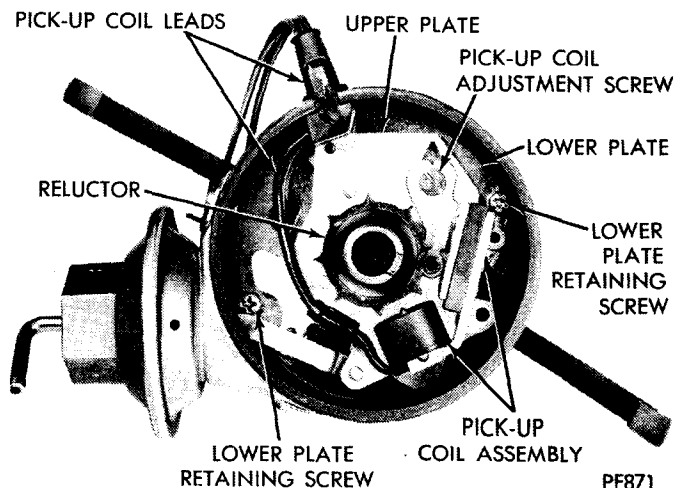
shaft retainer, and lift reluctor shaft from distributor shaft.

(9) Remove advance weight springs and advance weights. **Note position of slider blocks and bushings. Mark location of weights and springs so they may be reassembled in the same location.**

(10) Remove governor valve housing service band and gasket assembly. **Note: It will be necessary to break governor cover band seal and a new seal installed during reassembly.**

(11) Bend ears of lock plate from governor counterweight.

(12) Remove hexagon head plug from end of coun-



**Fig. 28—Distributor Inside View**

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terweight nut, using 1/8 inch allen wrench.

(13) Slip a 7/16 inch deep socket over disassembly Tool SE-2072-1 and loosen governor counterweight.

(14) Hold disassembly tool in a fixed position and unscrew governor counterweight by rotating the deep socket with fingers.

(15) When spring adjusting screw is completely out of governor counterweight, let deep socket and counterweight slide up shaft of special tool and push valve spring and spring adjusting nut out of opening in the opposite side of the distributor.

(16) Remove tachometer bearing nut, tachometer cover screws, cover, and gasket.

(17) Remove tachometer drive shaft assembly.

(18) Remove roll pin retaining tachometer gear to distributor shaft.

(19) Remove roll pin from distributor shaft and collar. Use a fine file and remove any burrs from pin holes in shaft.

(20) Slide distributor shaft from distributor housing.

(21) Remove upper plate and pick-up coil assembly from lower plate by depressing retaining clip and moving it away from mounting stud (Fig. 30).

(22) Remove upper plate and pick-up coil assembly.

**Note: Pick-up coil is not removable from upper plate and is serviced as an assembly.**

## CLEANING AND INSPECTION

The distributor body should be thoroughly **wiped clean**. The distributor **should not be cleaned in solvent**.

Solvent dissolves the lubricants in the bearings and tachometer drive housing.

Inspect distributor cap and rotor. Replace if there are signs of cracks, carbon tracking or burning. Test side play of shaft in distributor housing. If side play exceeds .006 inch, replace housing and bushings as an assembly and/or shaft assembly as required.

Inspect all bearing surfaces and pivot pins for roughness, binding or excessive looseness.

## ASSEMBLING THE DISTRIBUTOR (Refer to Figure 31)

(1) Place a small amount of distributor lube on upper plate support pins and lower plate support pin.

(2) Position upper plate on lower plate.

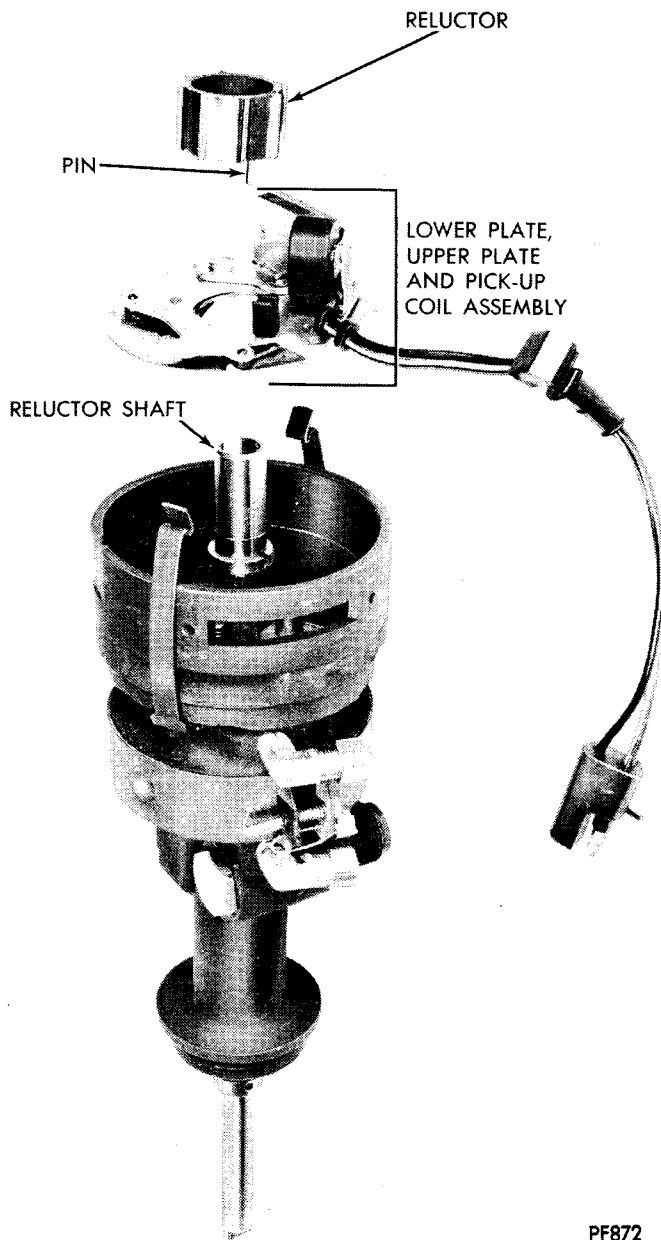
(3) Install retaining clip: upper plate must ride on three support pins of lower plate.

(4) With a silicone grease; lubricate area where advance weights contact lower weight plate and slot in advance weights where slider blocks fit in.

(5) Install bushings, weights, and slider blocks.

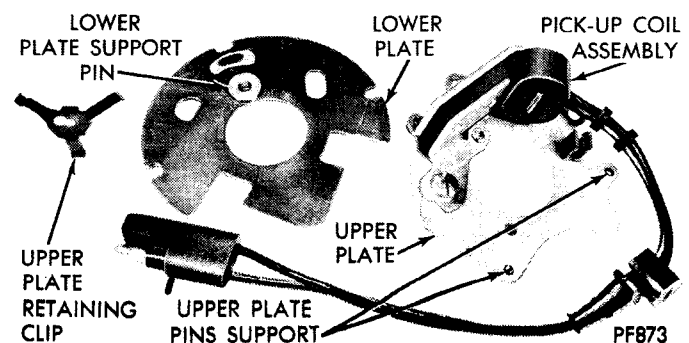
(6) Install reluctor shaft making sure that pins on shaft are positioned in slider blocks.

(7) Insert a new shaft retainer into shaft well to retain shaft and yoke to distributor shaft. Install felt wick into well and lubricate with two drops of SAE-10 engine oil.



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**Fig. 29—Reluctor and Pick Up (Removed)**



PF873

**Fig. 30—Upper and Lower Plate (Disassembled)**

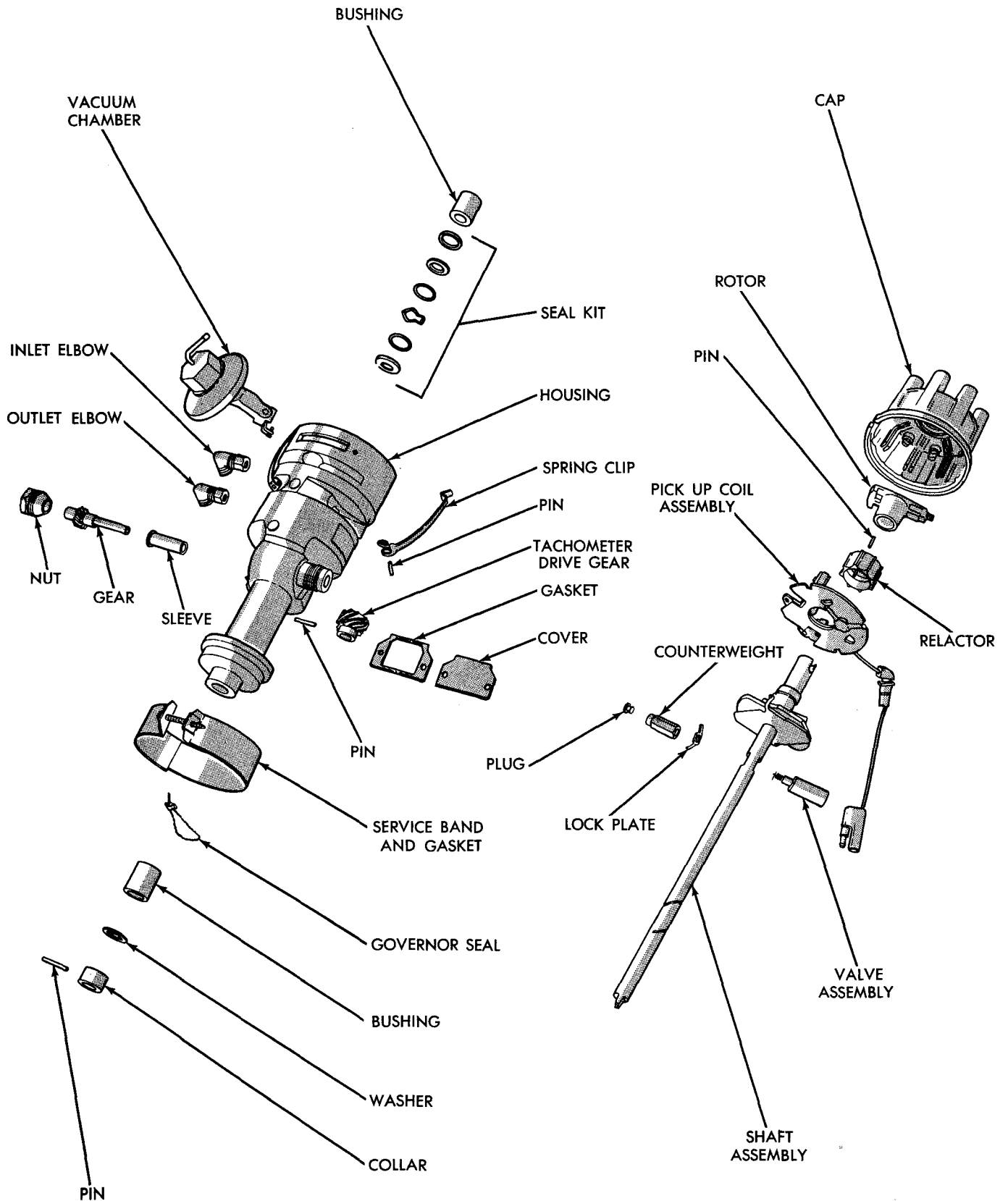


Fig. 31—Holley Distributor (Exploded View)

(8) Attach weight springs to weight pins and lower weight plate lugs, making sure springs are returned to their original position.

(9) Position tachometer drive gear in distributor housing and install distributor shaft into distributor housing and through tachometer drive gear aligning holes of gear with holes in distributor shaft and install roll-pin. If holes do not align, rotate gear 180 degrees.

(10) Install thrust washer between thrust collar and lower end of housing and install roll pin securely. If it is necessary to install a new tachometer gear, a new hole must be drilled through the hole in gear and through the shaft. Drill Hole 90 degrees off center of existing hole.

(11) Install a 7/16 inch deep socket on governor adjustment Tool SE-2072-1, slide counterweight nut and lock plate back on adjustment tool. Enter governor valve assembly from opposite side of distributor shaft and engage slot of adjustment tool over the governor valve adjusting nut. Flat surfaces on the distributor shaft are designed so that the governor valve cannot be incorrectly installed.

(12) After governor valve and counterweight are securely bottomed on distributor shaft, turn lock plate tank up against the counterweight. Final adjustment of governor must be made on engine.

(13) Position upper plate, lower, and pick-up coil assembly into distributor housing, and secure with retaining screws.

(14) Slide reluctor down reluctor sleeve and press firmly into place. Install reluctor so that two arrows are on top. In a clockwise distributor, arrow at keeper pin that holds reluctor in place should point clockwise. In a counterclockwise distributor, arrow at keeper pin should point counterclockwise.

(15) Connect vacuum advance control arm to upper plate, position housing into place and secure with retaining screws.

(16) Set air gap as follows:

(a) Align one reluctor tooth with pick up coil tooth.

(b) Loosen pick up coil hold down screw.

(c) Insert .006 **non-magnetic** feeler gauge between reluctor tooth and pick up coil tooth.

(d) Adjust air gap so that contact is made between reluctor tooth, feeler gauge, and pick up coil tooth.

(e) Tighten hold down screw.

(f) Remove feeler gauge. Note: No force should be required in removing feeler gauge.

(g) Check air gap with .008 feeler gauge. A .008 feeler gauge should not fit into air gap. **Caution:** A .008 feeler gauge can be forced into air gap. **DO NOT FORCE FEELER GAUGE INTO AIR GAP.**

(h) Apply vacuum to vacuum unit and rotate distributor shaft. Pickup pole should not hit reluctor

teeth. Gap was not properly adjusted if hitting occurs. If hitting occurs on only one side of reluctor, distributor shaft is probably bent. Replace governor and shaft assembly.

(17) Install distributor rotor.

(18) Install distributor.

## DISTRIBUTOR LUBRICATION

(1) Lubricate the felt wick in the top well of the reluctor shaft with 2 drops of SAE 10 W oil.

(2) Fill the tachometer gear cavity 1/2 full with Chevron OHT, or equivalent.

(3) At assembly apply a light coat of Dow Corning, Number 44 Silicone grease, or equivalent, to the reluctor shaft post weight slots and plate pads.

Pack grooves and cavity of reluctor shaft post and distributor shaft with Texaco Regal Star Fax, Number 21 or equivalent.

## GOVERNOR ADJUSTMENT

(1) Connect tachometer positive lead to the negative side of the ignition coil and the negative lead to a good ground.

(2) Start engine and run until normal operating temperature is attained. Momentarily open the throttle and release to be sure that the linkage is not binding. Check idle speed and set to specifications if required. Be sure idle speed screw seats firmly against its stop.

(3) Run engine up to governed speed and check tachometer for specified setting.

(4) If adjustment is required, **stop engine.**

(5) Remove service band from distributor governor valve.

(6) Crank engine until governor adjusting screw appears in distributor opening.

(7) Remove governor plug from counterweight with an 1/8 in. Allen wrench.

(8) Insert slotted end of governor adjusting Tool SE-2072-2, firmly in the counterweight hole until adjusting tangs are engaged (Fig. 32). Turn handle of

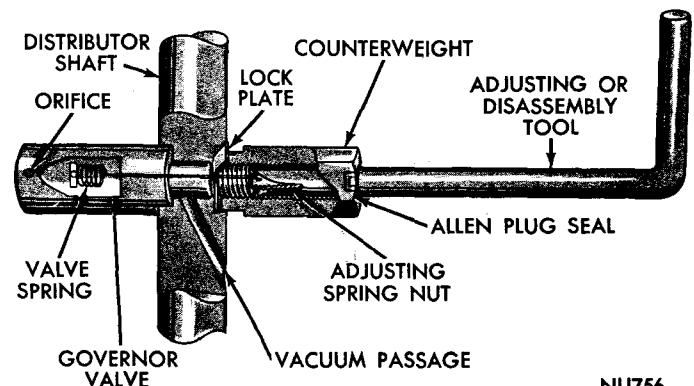


Fig. 32—Adjusting Governor

NU756

tool clockwise to decrease speed and counterclockwise to increase speed. One quarter turn will change speed approximately 100 RPM.

**CAUTION:** When checking the RPM adjustment, re-

move adjusting tool before starting engine.

(9) Reinstall counterweight plug and repeat step 3.

(10) Reinstall governor valve service band and governor seal wire when adjusted properly.

## INSTRUMENT PANELS AND GAUGES

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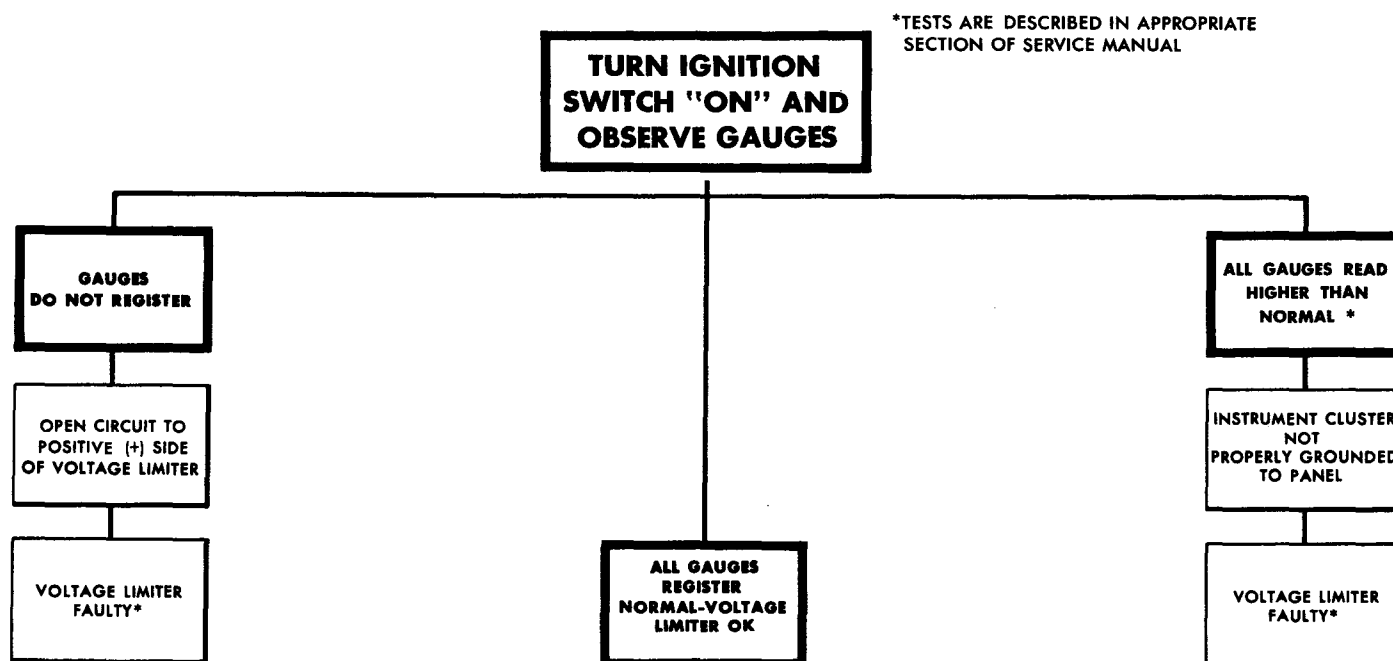
### GENERAL INFORMATION

The fuel, temperature, and oil pressure gauges operate on the constant voltage principle through a common voltage limiter which pulses to provide intermittent current to the gauge system.

#### Fuel Level Indicating System

A hinged float arm in the fuel tank raises or lowers dependent on the fuel level. The float arm contacts a variable resistor in the gauge sending unit that pro-

### VOLTAGE LIMITER DIAGNOSIS





## 8-70 ELECTRICAL—INSTRUMENT PANELS AND GAUGES

vides a change of resistance in the fuel gauge circuit with any up or down movement of the float. This resistance registers on the instrument panel gauge, metered to the capacity of the tank.

When the fuel level in the tank is low, the resistance of the circuit is increased restricting current flow and consequently positions the instrument panel gauge pointer to low.

Resistance in the circuit is at a minimum when the tank is full and the float arm is raised. With resistance at a minimum, current flow is high registering full on the instrument panel gauge.

### Temperature and Oil Indicating System

The operation of the temperature and oil pressure

indicating system are identical in operation with the fuel system with the exception of the method of varying the resistance of the sending unit. In the temperature system the sending unit resistance varies in direct relation to the temperature of the coolant.

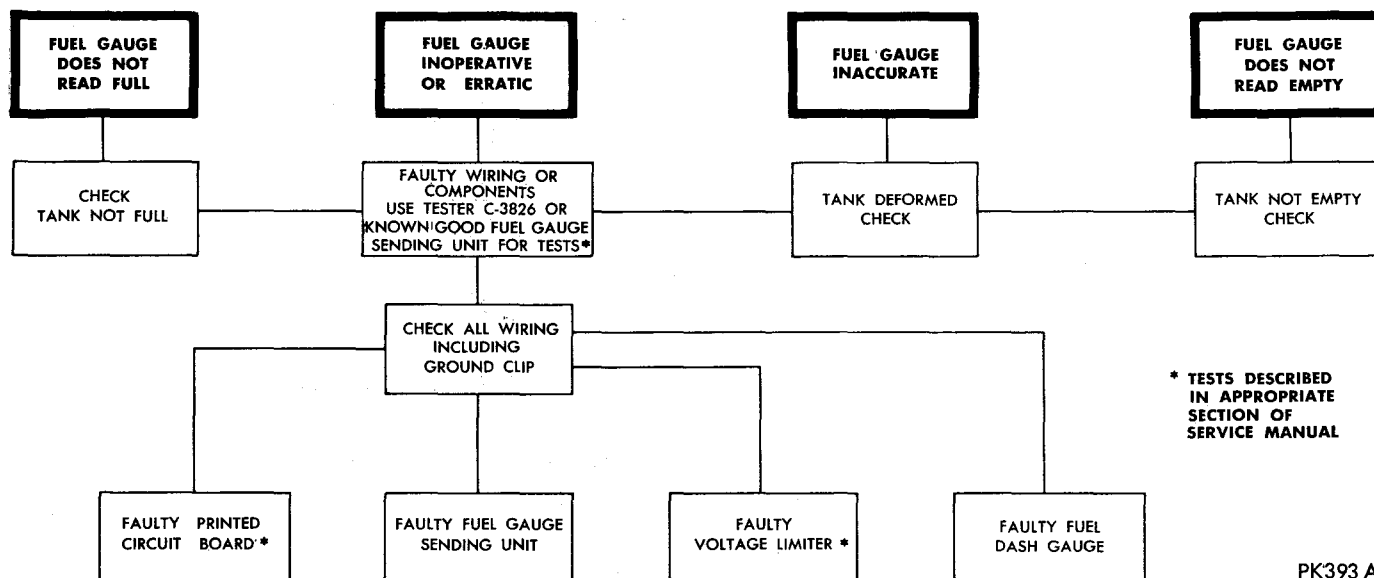
When the engine is cold the resistance of the disc in the temperature sending unit is high and a low temperature will be indicated on the gauge.

In the oil pressure indicating system the sending unit resistance is actuated by a diaphragm as the oil pressure increases or decreases, which will be indicated on the gauge.

### Oil Pressure Warning Lamp

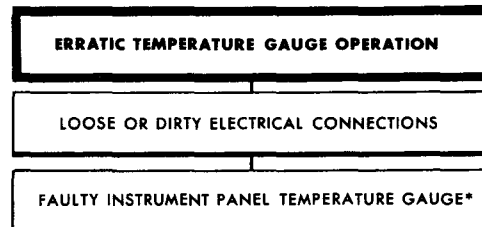
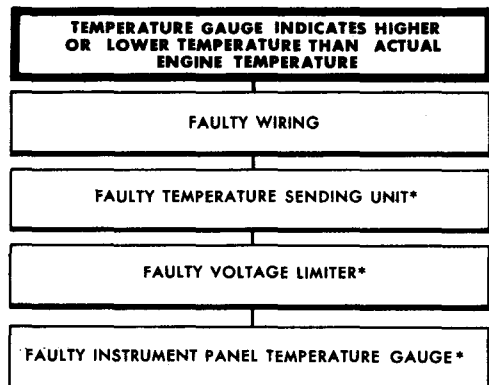
The oil pressure warning switch, mounted on the

### FUEL GAUGE SYSTEM DIAGNOSIS



PK393 A

### TEMPERATURE GAUGE DIAGNOSIS



\*TEST PROCEDURES ARE DESCRIBED IN APPROPRIATE SECTION OF SERVICE MANUAL.

PF673A

engine, is controlled by engine oil pressure.

When engine oil pressure is high (normal operating condition of the engine) the switch is held in the "OFF" or "OPEN" position allowing no current to flow to the oil pressure warning lamp on instrument panel.

When engine oil pressure is low the switch is in the "ON" or "CLOSED" position allowing current to flow to the oil pressure warning lamp on the instrument panel causing the warning lamp to be illuminated.

### Alternator Indicating System

The alternator gauge is an ammeter which senses

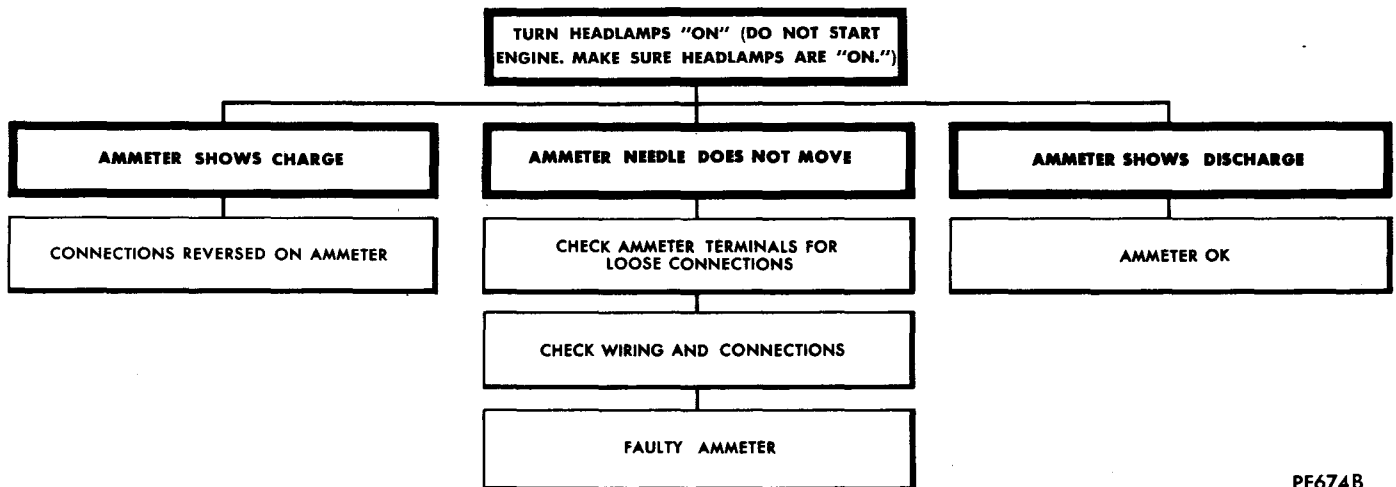
the direction and rate of flow of electrical current to or from the battery to indicate whether the battery is being charged or discharged.

### Speedometer

The speedometer system consists of the speedometer, cable assembly, and drive pinion gear in the transmission. The proper function of the system is dependent on the units in the system as well as the rear axle ratio and the size, type, and inflation of the rear tires.

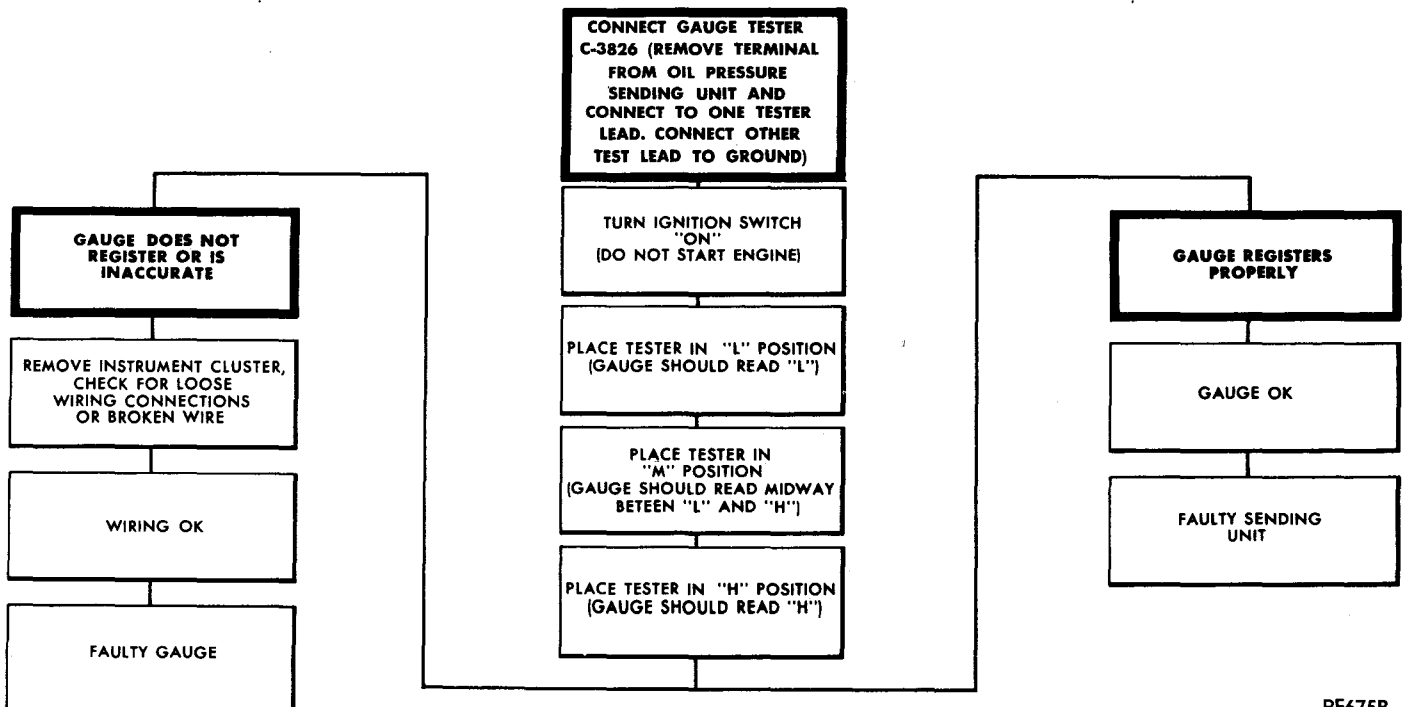
The speedometer cable assembly is equipped with a silencing sleeve, that functions as a noise reducing

## AMMETER DIAGNOSIS



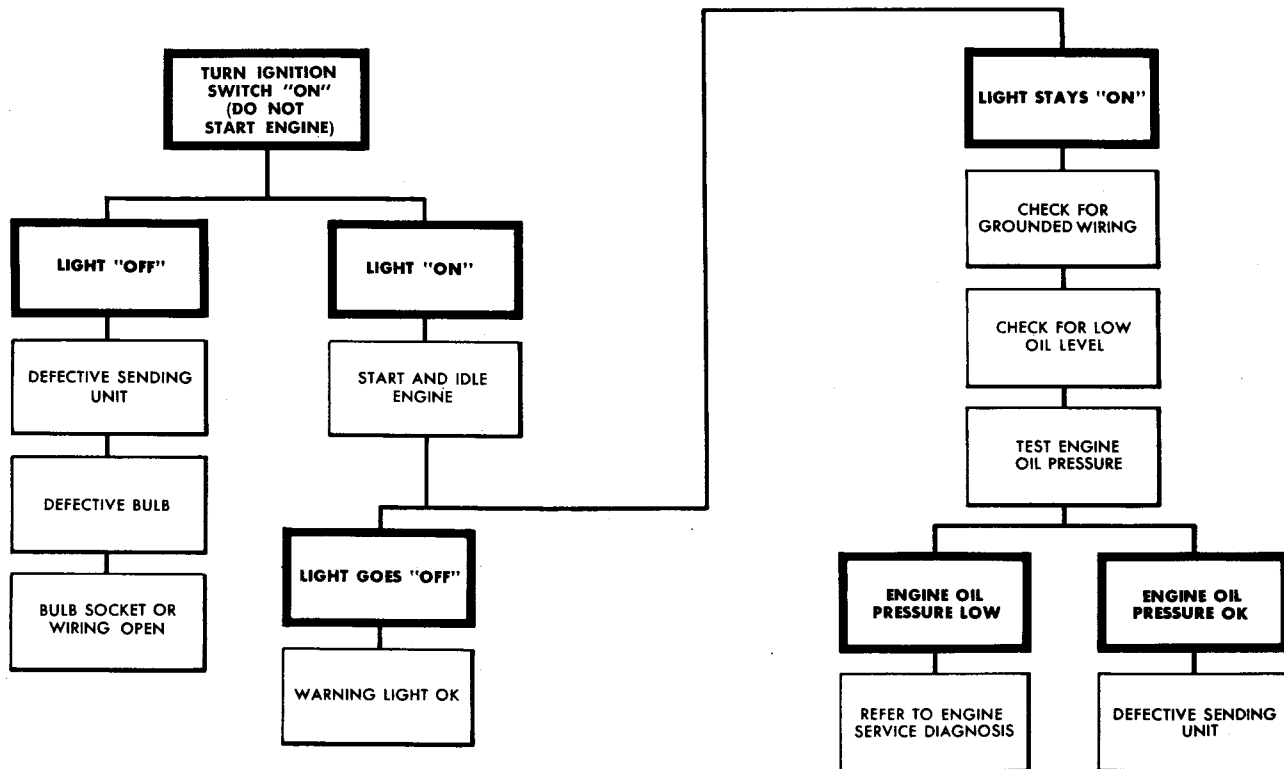
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## OIL PRESSURE GAUGE WARNING SYSTEM DIAGNOSIS



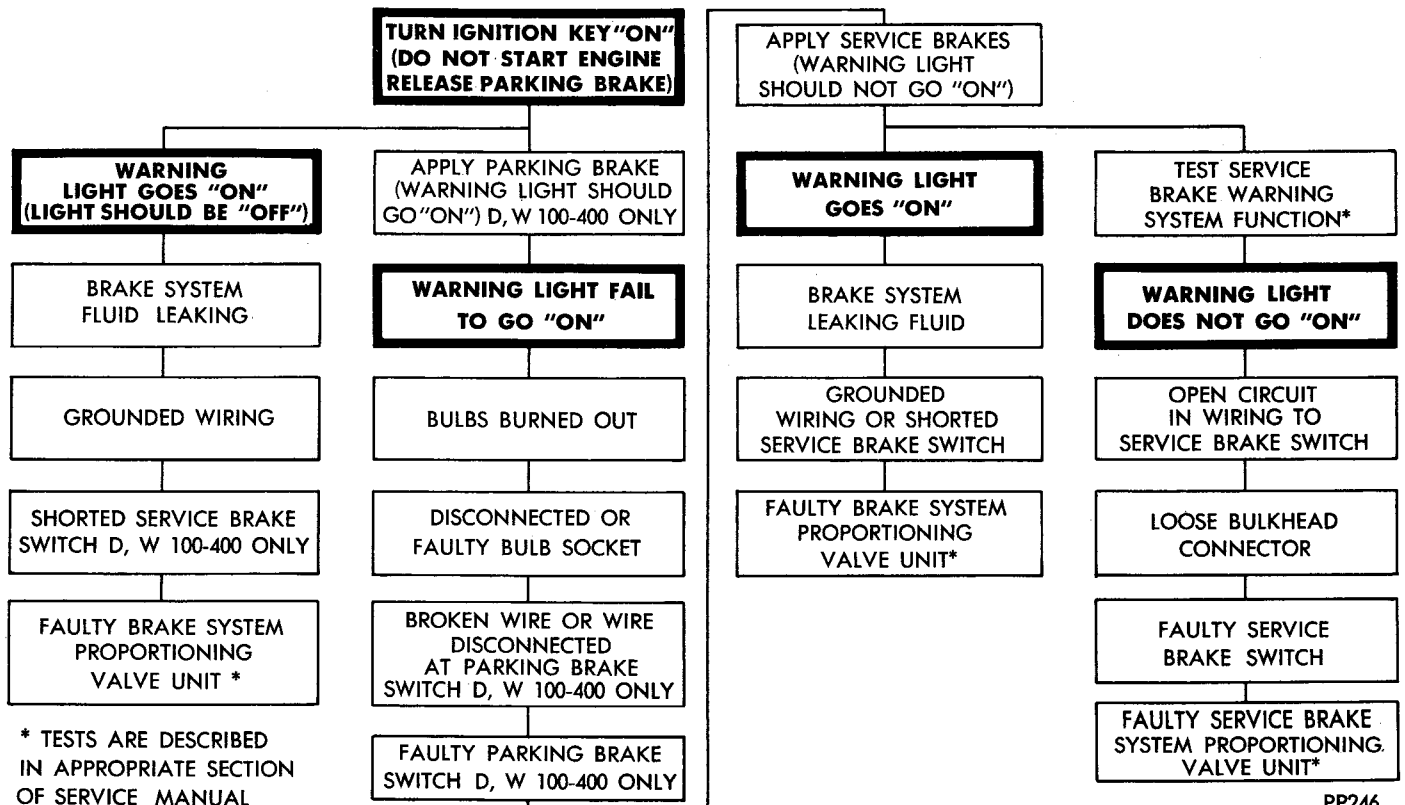
PF675B

### LOW OIL PRESSURE WARNING LIGHT DIAGNOSIS



PF738B

### BRAKE SYSTEM WARNING LIGHT DIAGNOSIS



\* TESTS ARE DESCRIBED IN APPROPRIATE SECTION OF SERVICE MANUAL

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device for the connection between the cable core and the speedometer unit.

### **Tachometer (Electric)**

The tachometer is a self contained electronic instru-

ment. It is connected to the ignition coil on the negative terminal. Through this connection the tachometer senses ignition firings and counts their number. This is shown by a pointer on the face of the instrument that is marked off in rpm so that the driver reads rpm.

## **TESTS IN VEHICLE**

### **Voltage Limiter—All Models**

The voltage limiter can be tested in the vehicle or with the instrument cluster removed. To quickly test the voltage limiter in the vehicle, connect one lead of a voltmeter to the temperature sending unit and the other lead to a good ground. Leave the sending unit lead wire attached to the sending unit.

Turn the ignition switch to the "ON" position. A fluctuating voltmeter indicates the voltage limiter is operating.

### **Fuel Gauge System Test**

#### **Preparation (Using Tester Tool C-3826)**

(1) Disconnect wire from terminal on fuel tank sending unit.

(2) Connect one lead of tester to disconnected wire and other lead to a good ground.

#### **Preparation (When Tester Tool C-3826 is not available)**

(1) Disconnect wire from terminal on fuel tank sending unit.

(2) Connect wire to a **known good** sending unit.

(3) Connect a jumper wire between sending unit fuel pick up tube and a good ground.

#### **Test (Using Tester Tool C-3826)**

(1) Check fuel gauge as described in following steps. Allow at least two minutes at each test point for gauge to settle. Tapping instrument panel will help position pointer.

(2) Turn ignition key to "on" position, turn tester knob to "L" position and observe gauge. Gauge should read "Empty", plus one pointer width, minus two pointer widths.

(3) Turn tester knob to "M", gauge should read "1/2 Full" plus or minus two pointer widths.

(4) Turn tester knob to "H", gauge should read "Full", plus two pointer widths minus one pointer width.

#### **Test (When Tester Tool C-3826 is not available)**

(1) Check fuel gauge as described in following

steps. Allow at least two minutes at each test point for gauge to settle. Tapping instrument panel will help position pointer.

(2) Clip float arm of sending unit to its empty stop and turn ignition key to "On" position.

(3) The gauge should read "Empty", plus one pointer width, minus two pointer widths.

(4) Move and clip sending unit float arm to full stop. The gauge should read "Full", plus two pointer widths, minus one pointer width.

### **Results (Both Methods)**

(1) If fuel gauge does not meet specifications, check following items as possible causes;

(a) Wiring and connections between gauge sending unit and multiple connector behind left cowl kick pad.

(b) Wiring and connections between multiple connector behind left cowl kick pad and printed circuit board terminals.

(c) Circuit continuity between printed circuit board terminals and gauge terminals.

(d) Voltage limiter performance.

If these items check okay, fuel gauge is defective and must be replaced.

(2) If fuel gauge meets specifications with tool C-3846 or known good sending unit, check fuel tank and original, installed fuel gauge sending unit as follows:

(a) Carefully remove fuel gauge sending unit from tank. Connect sending unit wire and jumper wire as outlined in "Preparation (When Tester Tool C-3826 is not Available)".

(3) If fuel gauge now checks within specifications, original installed sending unit is electrically okay, check following as possible cause:

(a) ground strap from sending unit to fuel line for continuity.

(b) sending unit deformed. Make sure sending unit float arm moves freely, pick up tube is not bent upwards so that there is not an interference fit with bottom of tank and inspect float.

(c) sending unit improperly installed, install properly.

(d) mounting flange on fuel tank for sending unit deformed, feel for interference fit of sending unit to bottom of tank. It is permissible to bend pick up tube down a little near mounting flange to gain interference fit.

(e) fuel tank bottom deformed causing improper positioning of sending unit pick up tube, replace or repair tank and recheck sending unit.

### **Temperature Gauge Test**

Disconnect the terminal from the temperature sending unit on the engine. Connect one test lead of tester C-3826 to the terminal and the other test lead to a good ground. Place the pointer of the gauge tester on the "L" position and turn the ignition switch to "on." The temperature gauge should show "C" plus or minus 1/8 inch.

Place the pointer of the tester on the "M" position and the temperature gauge should advance to the driving range left of 1/2 position of the dial. Place the pointer of the tester in the "H" position and the gauge should advance to the "H" position of the dial. Should the gauge respond to the above tests but not operate when the terminal is attached to the sending unit, indications are of a defective sending unit and it should be replaced.

Should the gauge fail to respond to the above tests, indications are of possible loose connections, broken wire, open printed circuit, or faulty gauge. The instrument cluster should be removed for further inspection. See "Instrument Cluster Removal."

### **Oil Pressure Warning Light**

To check the low oil pressure warning light system, turn ignition key to "ON" position and observe if oil pressure light comes on. If light comes on proceed and start engine. **If the light remains on immediately turn engine off and check engine oil pressure according to procedures as outlined in the engine section of this manual.** If it is determined that oil pressure is according to specifications, check for a grounded wire and/or replace oil pressure sending unit. When turning ignition key to the on position and the oil pressure light does not come on, disconnect lead at sending unit and touch it to ground. If the light bulb comes on replace the sending unit. If the light bulb does not come on the light bulb is burned out or the bulb socket, wiring and connections are faulty.

### **Oil Pressure Gauge—(If so equipped)**

Disconnect wire from the oil pressure sending unit on the engine. Connect one test lead of Tester Tool

C-3826 to the removed wire terminal the other test lead to a good ground. Place the pointer of the gauge tester on the "L" position and turn the ignition switch to "on." Do not start engine. The oil pressure gauge should show "L" plus or minus 1/8 inch.

Place the pointer on the tester on the "M" position and the oil pressure gauge should advance to the 1/2 position of the dial. Place the pointer of the tester in the "H" position and the gauge should advance to the "H" position of the dial.

Should the gauge respond to the above tests, but not operate when the wire is attached to the sending unit, the sending unit is defective. Should the gauge fail to respond to the above tests indications are of possible loose connections, broken wire, or faulty gauge. The instrument cluster should be removed for further tests. See "Instrument Cluster."

### **Brake System Warning Light**

The brake warning light flashes only when the parking brake is applied with the ignition key turned "ON". D,W, 100-800 only. The same light will also illuminate should one of the two service brake systems fail when the brake pedal is applied. To test the system turn the ignition key "ON", and apply the parking brake. D,W, 100-800 only. If the light fails to light, inspect for a burned out bulb, disconnected socket, a broken or disconnected wire at the switch.

To test the service brake warning system, raise the car on a hoist and open a wheel cylinder bleeder while a helper depresses the brake pedal and observes the warning light. If the light fails to light, inspect for a burned out bulb, disconnected socket, a broken or disconnected wire at the switch. If the bulb is not burned out and the wire continuity is proven, replace the brake warning switch in the brake line "Tee" fitting mounted on the frame rail in the engine compartment below the master cylinder.

### **Ammeter Test**

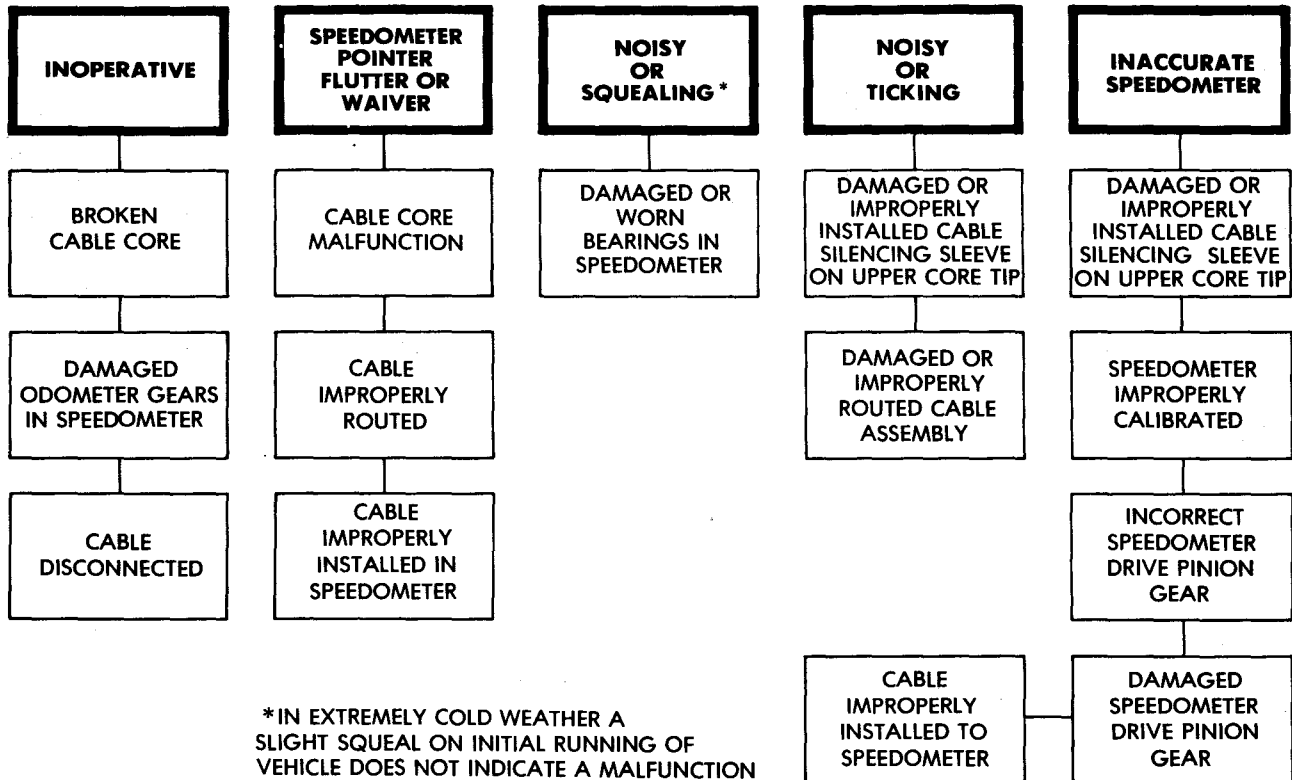
Turn the headlight on (do not start engine). The ammeter needle should move toward the "D" or discharge scale. If no movement of the needle is observed, check the terminals for loose wires. If the terminals are secure, the ammeter is defective. If the needle moves toward "C" or charge the connections are reversed.

## **TESTS OUT OF VEHICLE**

### **Printed Circuit Board**

A visual inspection of the conductors should be

### SPEEDOMETER AND CABLE DIAGNOSIS



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made for cracks or damaged circuits. If no visual damage is evident, each circuit should be tested for continuity with an ohmmeter or a test light. Should an open circuit be detected, the printed circuit board should be replaced.

#### Gauges

(1) Connect a jumper wire to voltage limiter input (ign.) terminal. Connect other end of the jumper wire to positive post (+) of a 12 volt test battery.

(2) Connect a jumper wire from negative (—) post of battery to instrument cluster base (ground).

(3) Connect one lead from Tester C-3826 to gauge sending terminal being tested.

(4) Connect remaining tester lead to instrument cluster base (ground).

When the gauge tester is in "L" position, the gauge being tested should read on the low side of dial. With gauge tester on "M", the gauge should read in the center of the dial scale and on the high end of the dial when pointer of tester is placed on "H". If gauges do not perform as stated, inspect for an open printed circuit before replacing gauge.

**Caution:** A direct connection from a 12 volt battery will damage the gauges or printed circuit boards.

#### INSTRUMENT CLUSTER

##### *Bezel (Without Optional Gauges)* Refer to Figure 1

##### Removal

(1) Remove three mounting screws along lower edge of bezel.

(2) Remove four mounting screws along upper edge of bezel.

(3) Remove eight mounting screws from face of bezel.

(4) Remove bezel from cluster.

##### Installation

(1) Position bezel into place on cluster, install all mounting screws and tighten securely.

##### *Bezel (With Optional Gauges)* Refer to Figure 3

##### Removal

**CAUTION:** On vehicles equipped with air brakes it will be necessary to bleed air from brake system. Refer to Group 05, Brakes.

(1) Remove three mounting screws along lower edge of bezel.

(2) Remove four mounting screws along upper edge of bezel.

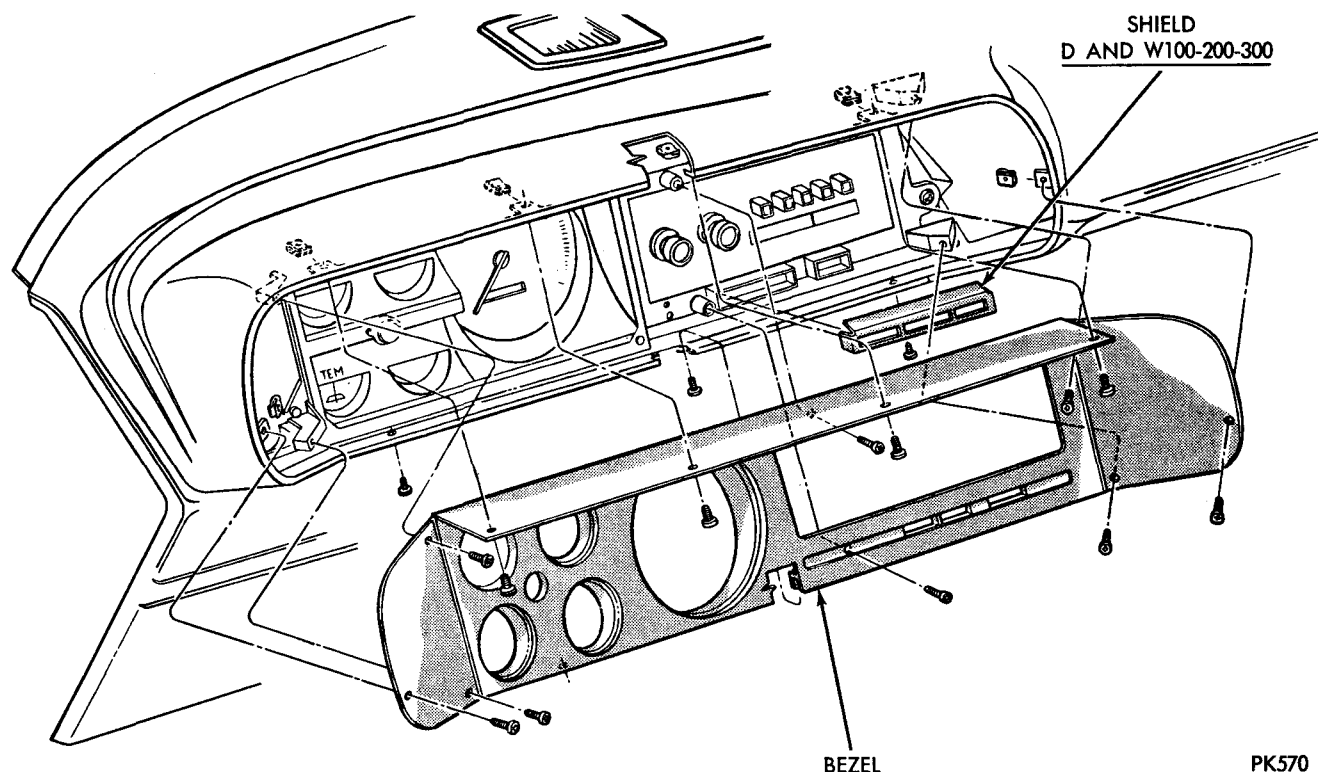


Fig. 1—Instrument Cluster Bezel

PK570

(3) Remove eight mounting screws from face of bezel.

(4) Pull bezel out far enough to gain access to any electrical, and/or mechanical leads and disconnect.

(5) Remove bezel assembly.

### Installation

(1) Position bezel to cluster and connect all electrical and/or mechanical leads.

(2) Position bezel into place on cluster, install all mounting screws and tighten securely.

**CAUTION:** On vehicles equipped with air brakes it will be necessary to build up air pressure in brake system before vehicle can be moved. Refer to Group 05, Brakes.

### Cluster Assembly (Fig. 2)

#### Removal

(1) Disconnect fusible link in engine compartment.

(2) Tape or cover steering column to prevent damage to paint.

(3) Remove cluster bezel.

(4) Remove radio, if so equipped.

(5) Remove left air conditioner duct, if so equipped.

(6) Working under instrument panel, disconnect speedometer cable from cluster.

(7) From front of panel, remove cluster assembly mounting screws.

(8) Maneuver cluster assembly out of panel far

enough to gain access to rear and disconnect all electrical leads.

(9) Remove cluster assembly from panel.

### Installation

(1) Position cluster assembly on lower edge of opening in panel.

(2) Reach behind cluster assembly and connect all electrical leads to cluster.

(3) Position cluster assembly into place in panel opening, making sure not to pinch any wires, install mounting screws and tighten securely.

(4) Working from under instrument panel connect speedometer cable to cluster.

(5) Install radio, if so equipped.

(6) Install cluster bezel.

(7) Install left air conditioner duct, if so equipped.

(8) Remove protective cover from steering column.

(9) Connect fusible link.

(10) Check to see that all instruments are functioning properly.

### GAUGES

#### Fuel Gauge

#### Temperature Gauge

#### Ammeter Gauge

#### Oil Gauge

#### Speedometer

#### Removal

(1) Remove cluster assembly.

- (2) Place cluster on padded work bench.
- (3) Remove cluster mask snap retainers.
- (4) Remove cluster mask.
- (5) Any gauge in cluster housing may now be serviced by removing either mounting screws or nuts located at rear of cluster housing.
- (6) Remove gauge from front of housing.

### Installation

- (1) Position gauge into cluster housing, install mounting screws or nuts, and tighten securely.
- (2) Position cluster mask to cluster housing and install snap retainers.
- (3) Install cluster assembly.

### PRINTED CIRCUIT BOARD

#### Removal

- (1) Remove fuel, temperature, oil, and ammeter gauges. It is not necessary to remove speedometer.
- (2) Remove voltage limiter and radio noise suppression capacitors.
- (3) Remove all lamp socket assemblies by rotating counterclockwise.
- (4) Remove mounting screws attaching printed circuit board to cluster housing.

circuit board to cluster housing.

- (5) Remove printed circuit board.

### Installation

- (1) Position printed circuit board on cluster housing, install mounting screws, and tighten snugly.  
**CAUTION: Do not over tighten mounting screw for damage to printed circuit board will occur.**
- (2) Install all lamp socket assemblies to printed circuit board and lock into place by rotating clockwise.
- (3) Install voltage limiter and radio noise suppression capacitors.
- (4) Install fuel, temperature, oil, and ammeter gauges.

### SWITCHES (Figs. 4, 5)

#### Headlight Switch

#### Removal

- (1) Disconnect fusible link in engine compartment.
- (2) If so equipped, remove left air conditioner and air outlet assembly.
- (3) Reaching under instrument panel, depress knob and stem release button located on bottom of switch housing and at same time pull knob and stem

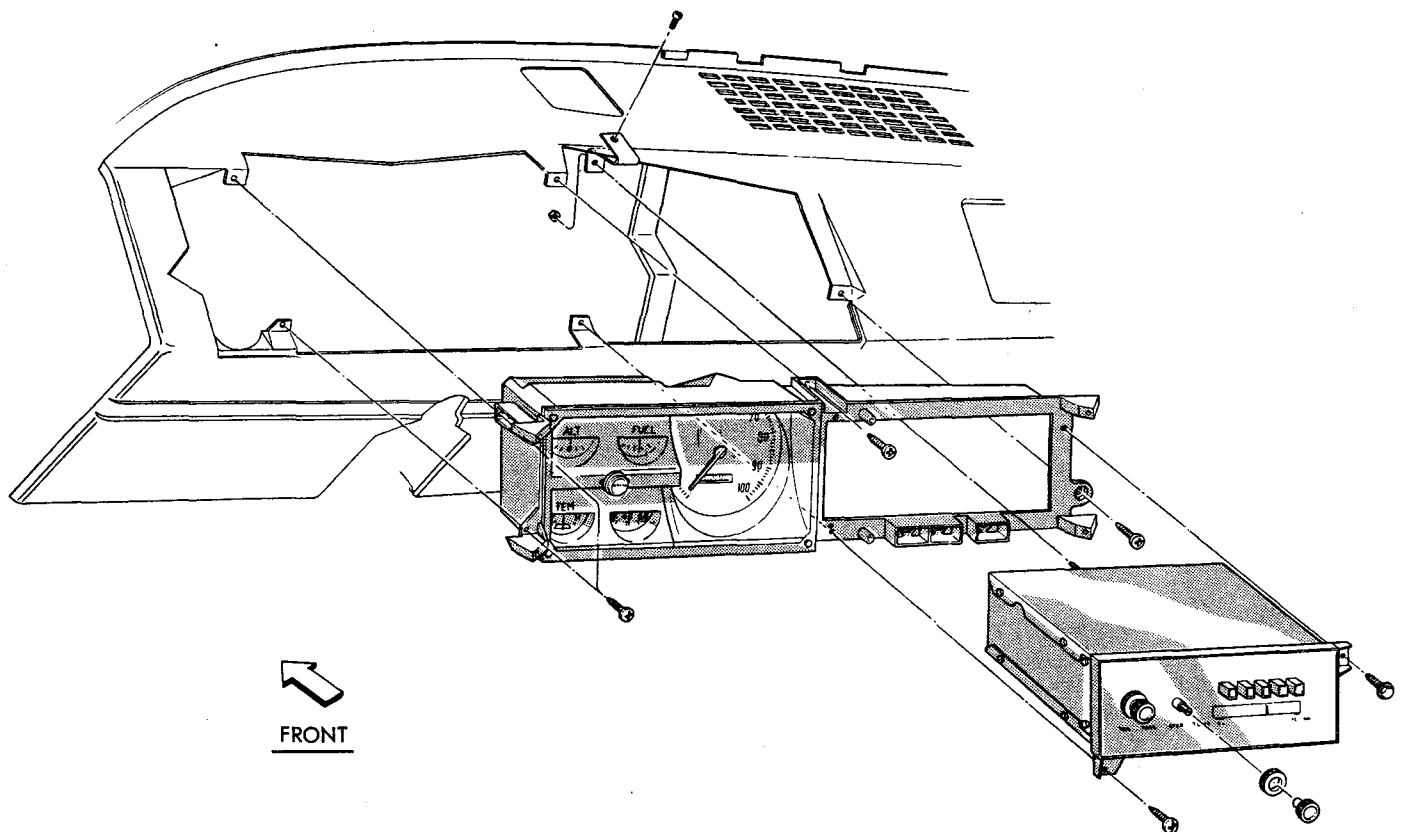


Fig. 2—Instrument Cluster



assembly out of switch housing located on front of panel.

(4) From front of panel remove spanner nut, mounting switch to panel.

(5) Reaching under instrument panel, lower switch down far enough to remove electrical leads.

(6) Disconnect electrical leads from switch.

(7) Remove switch.

### Installation

(1) Connect all electrical leads to switch.

(2) Guide switch into position in panel, install spanner nut and tighten securely.

(3) Insert knob and stem assembly into switch.

(4) If so equipped, install air conditioner duct, and air outlet assembly.

(5) Connect fusible link.

(6) Check operation of switch.

### Windshield Wiper/Washer Switch

#### Removal

(1) Disconnect fusible link in engine compartment.

(2) Remove ash tray housing.

(3) Loosen set screw on control knob and remove knob from shaft.

(4) From front of panel, remove spanner nut, mounting switch to panel.

(5) Working through ash tray housing opening,

lower switch down far enough and disconnect electrical leads and remove lighting bracket.

(6) Remove switch.

### Installation

(1) Working through ash tray housing opening, connect electrical leads and install lighting bracket to switch.

(2) Position switch into place in panel, install spanner nut and tighten securely.

(3) Install knob on shaft and tighten set screw securely.

(4) Install ash tray housing.

(5) Connect fusible link.

(6) Check operation of switch.

### Cargo Lamp Switch (D and W100, 200, 300)

#### Removal

(1) Remove instrument cluster assembly.

(2) Loosen set screw on control knob and remove knob from shaft.

(3) Disconnect electrical leads from switch.

(4) Remove nut mounting switch to panel.

(5) Remove switch.

(6) Remove reinforcement bracket from switch.

### Installation

(1) Install reinforcement bracket on switch.

(2) Position switch into place in panel, install

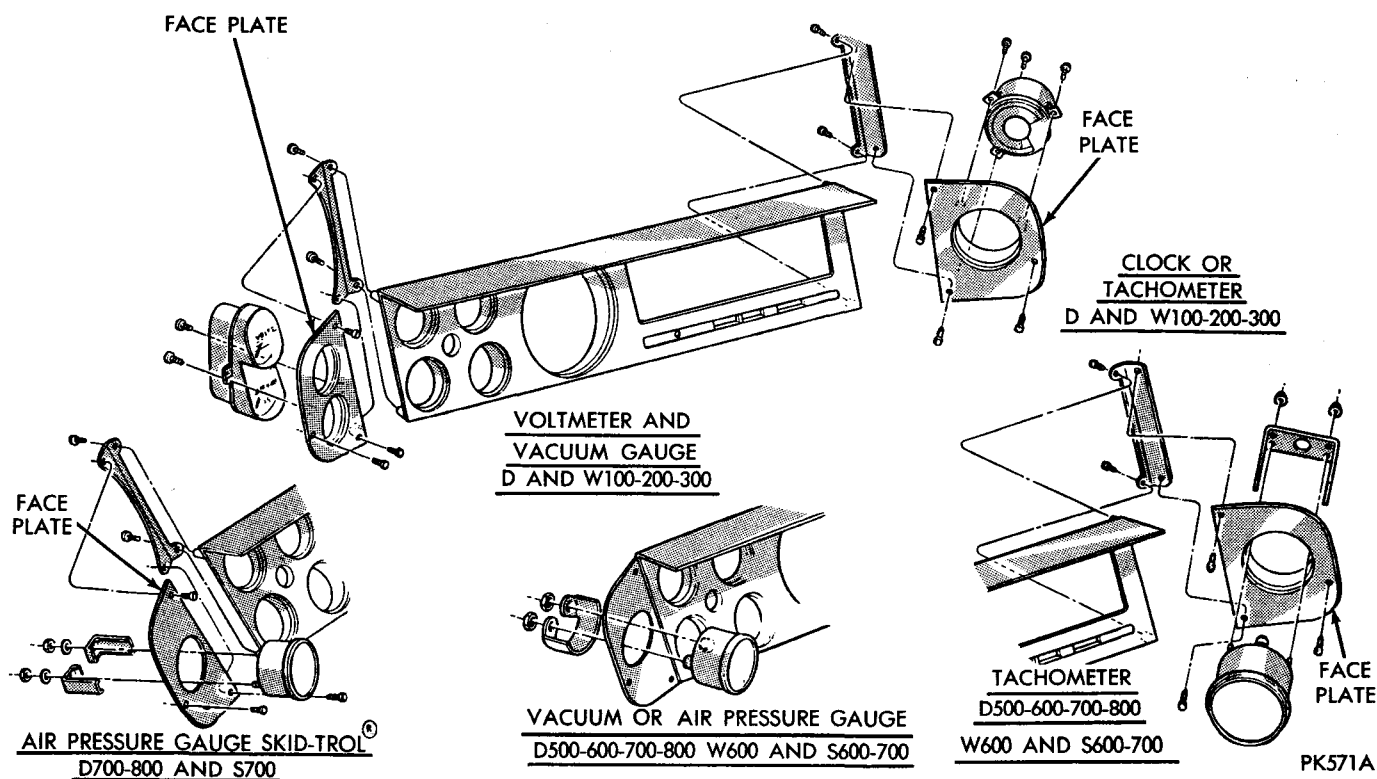


Fig. 3—Optional Gauges

mounting nut, and tighten securely.

(3) Connect electrical leads to switch.

(4) Insert knob on shaft and tighten set screw securely.

(5) Install instrument cluster assembly.

### Auxiliary Headlight Switch (Used with Sno-Fiter Option) Auxiliary Fuel Tank Switch

#### Removal

(1) Disconnect fusible link in engine compartment.

(2) If so equipped, remove left air conditioner duct.

(3) Loosen set screw on control knob and remove knob from shaft.

(4) From front of panel remove nut mounting switch to panel.

(5) Reaching under instrument panel, lower switch down far enough to remove electrical leads and reinforcement bracket.

(6) Remove electrical leads and reinforcement bracket from switch.

(7) Remove switch.

#### Installation

(1) Connect all electrical leads to switch.

(2) Install reinforcement bracket on switch.

(3) Guide switch into opening in panel making sure reinforcement bracket is properly positioned.

(4) Install mounting nut on switch and tighten securely.

(5) Insert knob on shaft and tighten set screw.

(6) If so equipped, install air conditioner duct.

(7) Connect fusible link.

(8) Check operation of switch.

### Ignition Switch

(D500, D600, D800, W600 and S600)

#### Removal

(1) Disconnect fusible link in engine compartment.

(2) Remove ash tray housing.

(3) From front of panel remove spanner nut, mounting switch to panel.

(4) Reaching under panel, lower switch down far enough to disconnect electrical leads.

(5) Remove switch.

#### Installation

(1) Connect electrical leads to switch.

(2) Position switch into place in panel, install mounting nut, and tighten securely.

(3) Install ash tray housing.

(4) Connect fusible link.

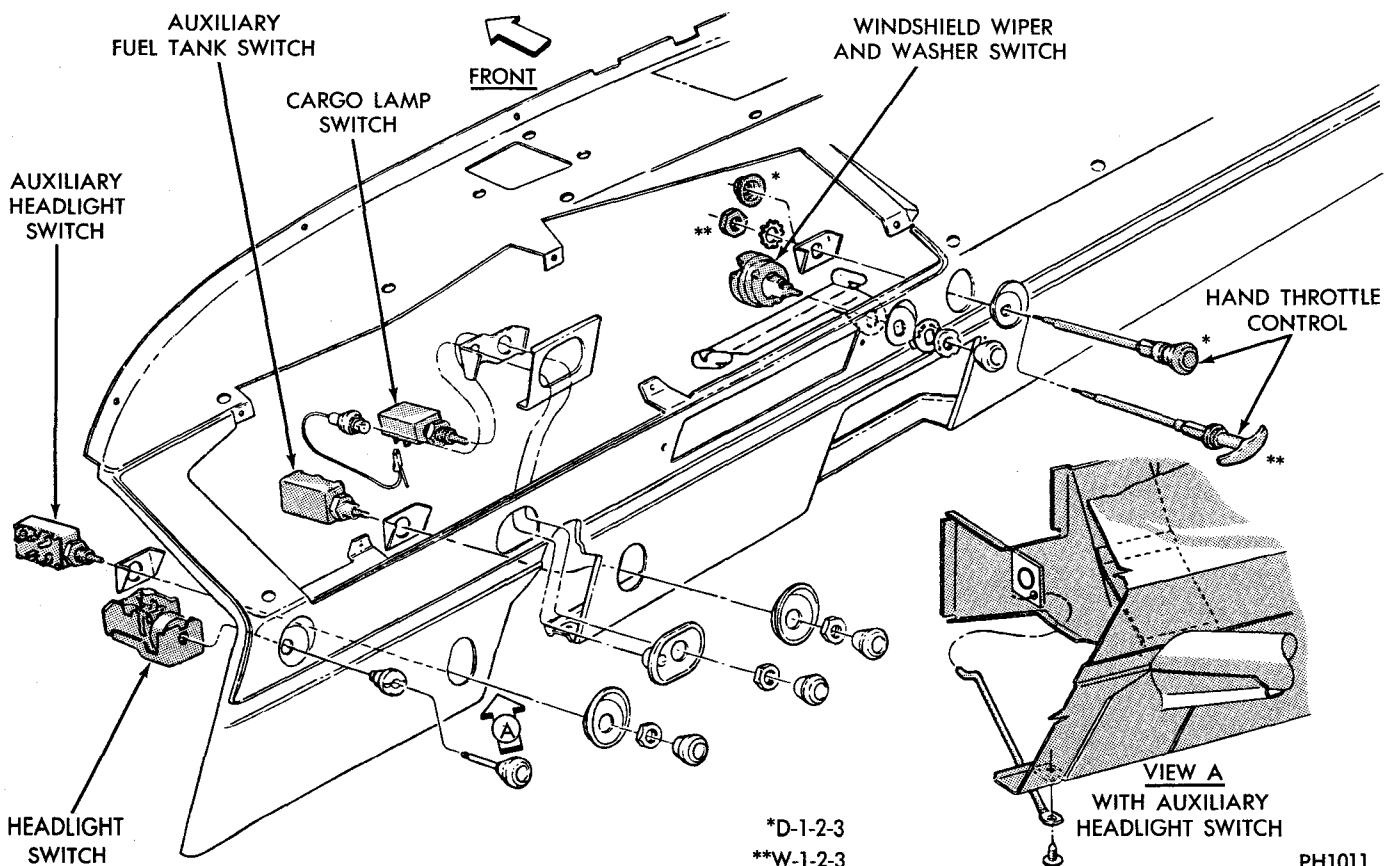


Fig. 4—Switches

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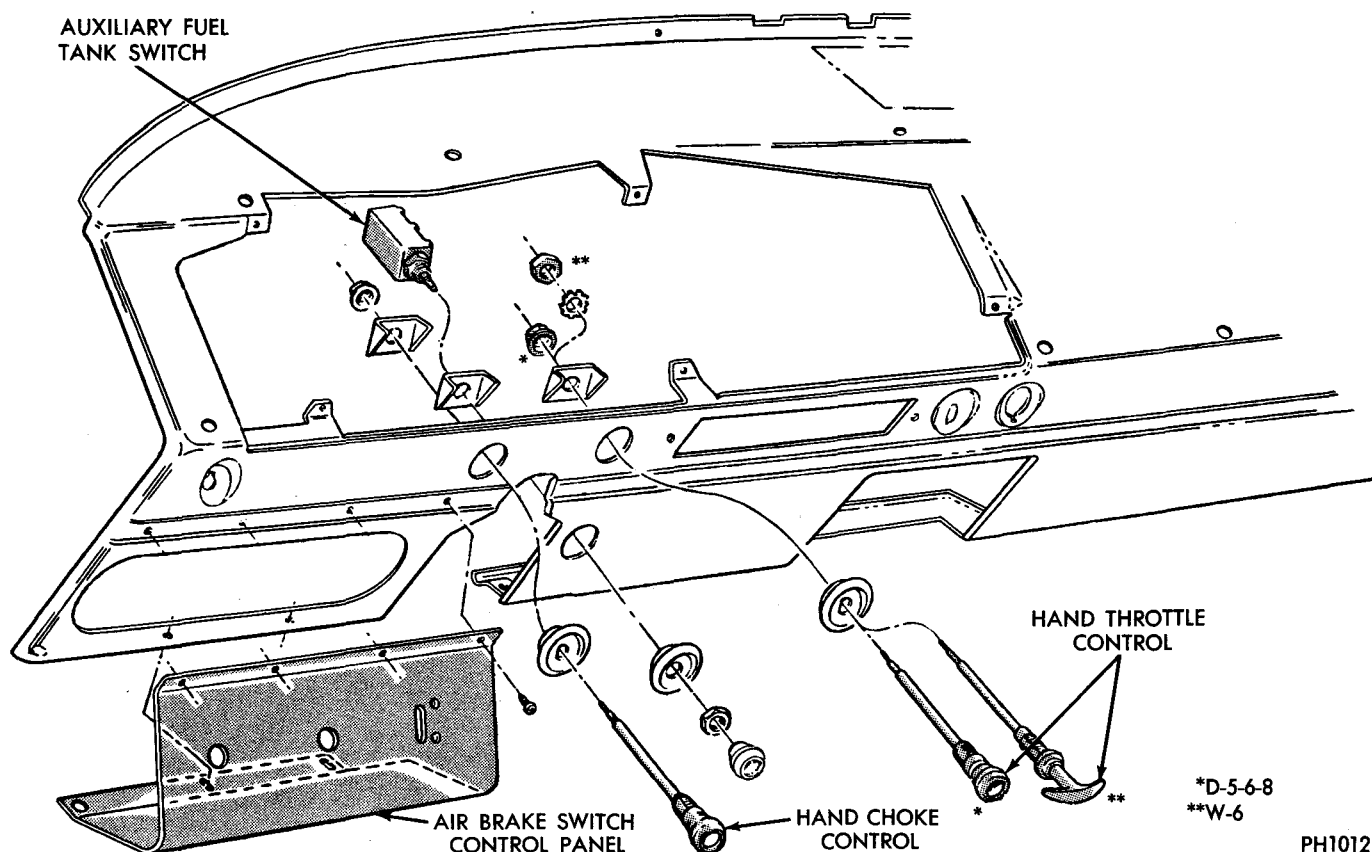


Fig. 5—Switches Extra Equipment D500-600-700-800-W600

**Ignition Switch**  
(D100, D200, D300, W100, W200 and W300)  
Refer to Group 19, Steering Column.

**HEATER CONTROLS**  
**HEATER AND AIR CONDITIONER CONTROLS**  
(Refer to Figure 6)

#### Removal

- (1) Disconnect fusible link in engine compartment.
- (2) If so equipped, remove left air conditioner duct.
- (3) From under instrument panel, remove control to reinforcement bracket mounting screw.
- (4) From front of panel, remove control mounting screws.
- (5) Reach under panel and guide control down far enough to disconnect all cables, vacuum hoses, and electrical leads.
- (6) Remove control.

#### Installation

- (1) Connect all cables, vacuum hoses, and electrical leads to control. It will be necessary to adjust cables, refer to Group 24, for adjustment procedures.
- (2) Position control into place in panel, install mounting screw on front of panel, and tighten securely.

- (3) From under panel install control to reinforcement bracket mounting screw and tighten securely.
- (4) If so equipped, install air conditioner duct.
- (5) Connect fusible link.

**INSTRUMENT CLUSTER TRIM HOOD**  
(Refer to Figure 6)

#### Removal

- (1) Remove cluster assembly.
- (2) Working through cluster open in panel, remove all trim hood mounting nuts.
- (3) Remove trim hood.

#### Installation

- (1) Position trim hood into place on panel, install mounting nuts, and tighten securely.
- (2) Install cluster assembly.

**ASH TRAY**  
(Refer to Figure 7)

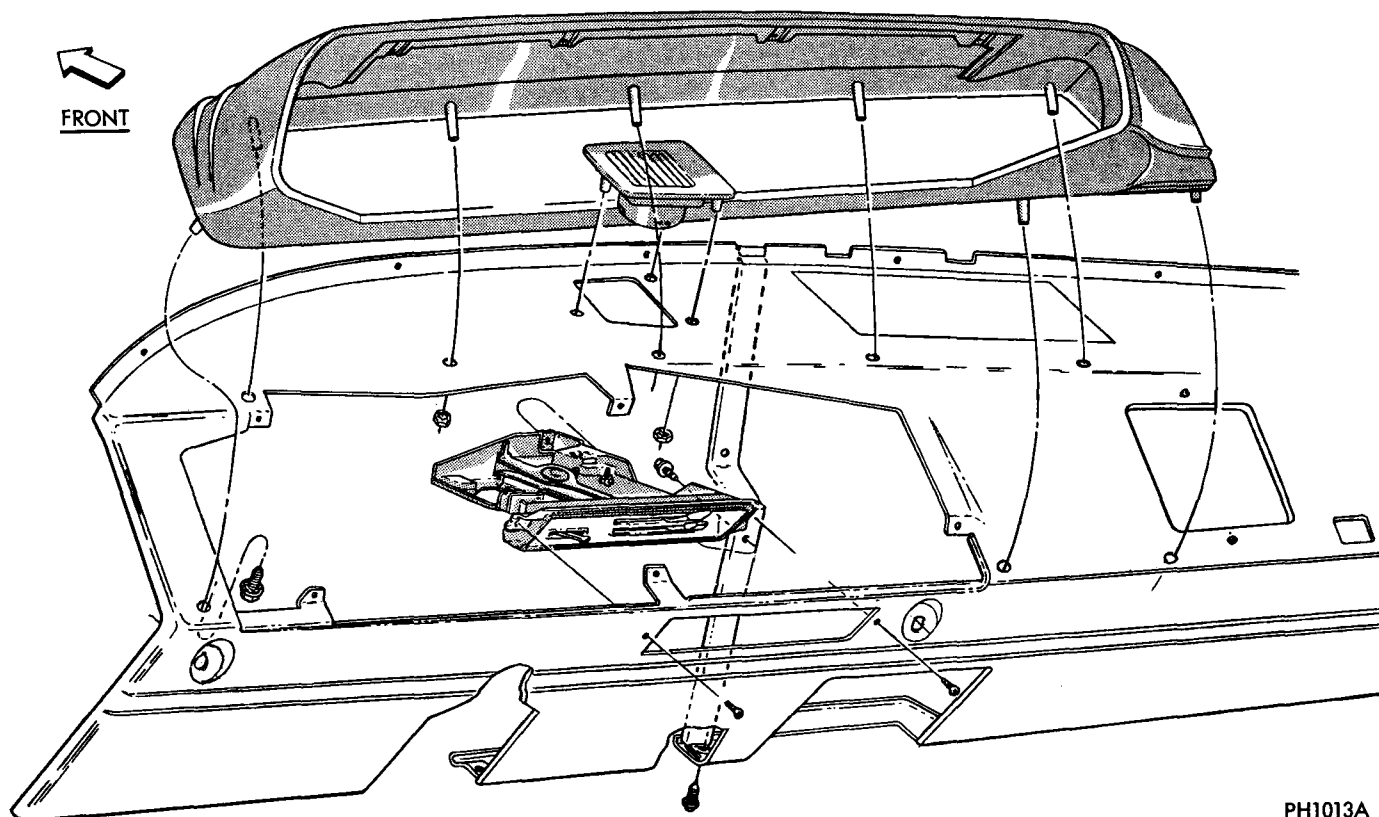
#### Tray

#### Removal

- (1) Open ash tray.
- (2) Push down on spring tab, tilt ash tray downwards, and remove.

\*D-5-6-8  
\*\*W-6

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**Fig. 6—Heater Controls, Trim Pad and Defroster Air Outlets**

### **Installation**

- (1) Position ash tray on pivot bar of housing.
- (2) Push ash tray inwards to close position.

### **Housing**

#### **Removal**

- (1) Remove ash tray.
- (2) Remove housing mounting screws.
- (3) Pull housing out far enough to disconnect electrical leads, if so equipped.
- (4) Remove housing and remove cigarette lighter, if so equipped.

#### **Installation**

- (1) If so equipped, install cigarette lighter in housing.
- (2) If so equipped, connect electrical leads to housing.
- (3) Position housing into place in panel, install mounting screws and tighten securely.
- (4) Install ash tray.

### **CIGARETTE LIGHTER** (Refer to Figure 7)

#### **Removal**

- (1) Remove ash tray housing.
- (2) Remove lighter element from shell.

- (3) Turn clamp counterclockwise and remove.
- (4) Remove shell through front of housing.

#### **Installation**

- (1) Insert shell through front of housing.
- (2) Install clamp on shell, turn clockwise and tighten securely.
- (3) Install lighter element.
- (4) Install ash tray housing.

### **GLOVE BOX (Fig. 8)**

#### **Box**

#### **Removal**

- (1) Depress top and bottom edges of box together, lift upwards and remove, (Fig. 9).

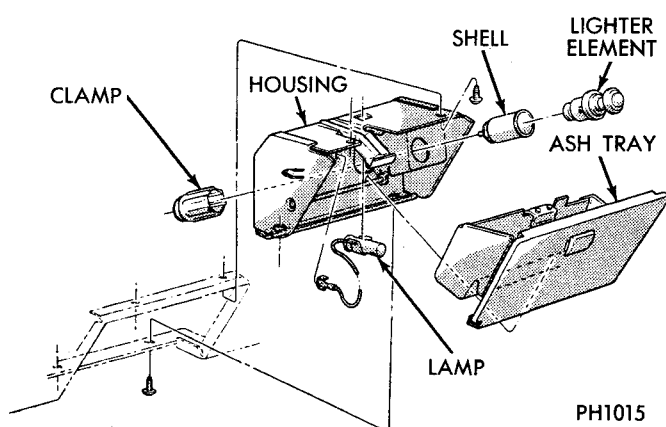
#### **Installation**

- (1) Depress top and bottom edges of box together and insert into opening in panel, making sure locating tab on box lower edge goes into slotted opening in panel.

#### **Door**

#### **Removal**

- (1) Open glove box door.
- (2) Remove screws attaching door to hinge.
- (3) Remove door.



**Fig. 7—Ash Tray and Cigarette Lighter**

### Installation

- (1) Position door to hinge, install mounting screws and tighten securely.
- (2) Close glove box door.

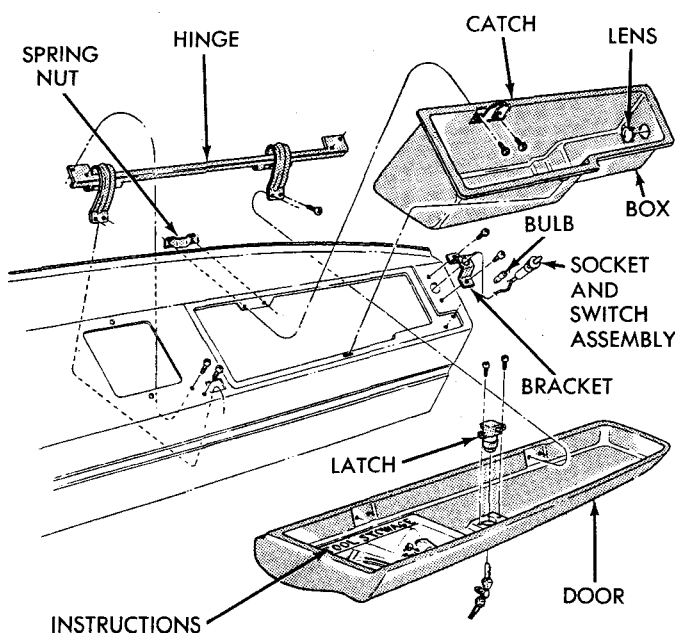
### Door Hinge

#### Removal

- (1) Remove glove box.
- (2) Remove glove box door.
- (3) Remove hinge mounting screws.
- (4) Working through opening in panel, remove hinge.

#### Installation

- (1) Position hinge into place, install mounting screws and tighten securely.
- (2) Install glove box door.
- (3) Install glove box.



**Fig. 8—Glove Box**

### Latch

#### Removal

- (1) Open glove box door.
- (2) Remove latch mounting screws.
- (3) Remove latch.

#### Installation

- (1) Position latch into place, install mounting screws and tighten securely.
- (2) Close glove box door.

### Catch

#### Removal

- (1) Open glove box door.
- (2) Remove glove box.
- (3) Remove catch mounting screws.
- (4) Remove catch.

#### Installation

- (1) Position catch and spring nut into place, install mounting screws and tighten securely.
- (2) Install glove box.
- (3) Close glove box door.

## AIR CONDITIONER DISTRIBUTION DUCTS AND AIR OUTLETS (Fig. 10)

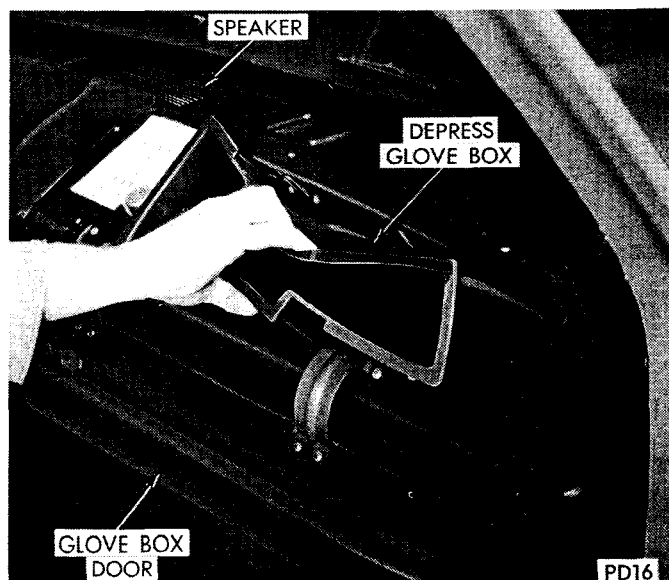
### Left Distribution Duct

#### Removal

- (1) Remove duct mounting screw.
- (2) Remove duct. On models equipped with manual transmissions it will be necessary to depress clutch pedal in order to maneuver duct out.

#### Installation

- (1) Position duct into place, install mounting screw and tighten securely.



**Fig. 9—Removing Glove Box**

### Right Distribution Duct

#### Removal

- (1) Remove glove box.
- (2) Remove duct mounting screw.
- (3) Remove right air outlet mounting screws.
- (4) Working through glove box opening, rotate duct towards front of vehicle and remove.
- (5) Remove air outlet from duct.

#### Installation

- (1) Install air outlet on duct.
- (2) Install duct through glove box opening and position into place.
- (3) Install air outlet mounting screws and tighten securely.
- (4) Install duct mounting screw and tighten securely.

### Housing Center Outlet Duct

#### Removal

- (1) Remove left and right distribution ducts.
- (2) Remove screws mounting center duct to housing.
- (3) Remove duct.

#### Installation

- (1) Position duct into place, install mounting screws and tighten securely.

- (2) Install right and left distribution ducts.

### Center Distribution Duct

#### Removal

- (1) Remove housing center outlet duct.
- (2) Remove distribution duct.

#### Installation

- (1) Position duct into place.
- (2) Install housing center outlet duct.

### Air Outlets

#### Right

#### Removal

- (1) Remove glove box.
- (2) Remove air outlet to panel mounting screws.
- (3) Remove right distribution duct mounting screw.
- (4) Working through glove box opening, rotate right duct and air outlet assembly towards front of vehicle.
- (5) Remove air outlet assembly from duct.

#### Installation

- (1) Insert air outlet on right distribution duct.
- (2) Rotate duct to position air outlet into place in panel, install mounting screws and tighten securely.

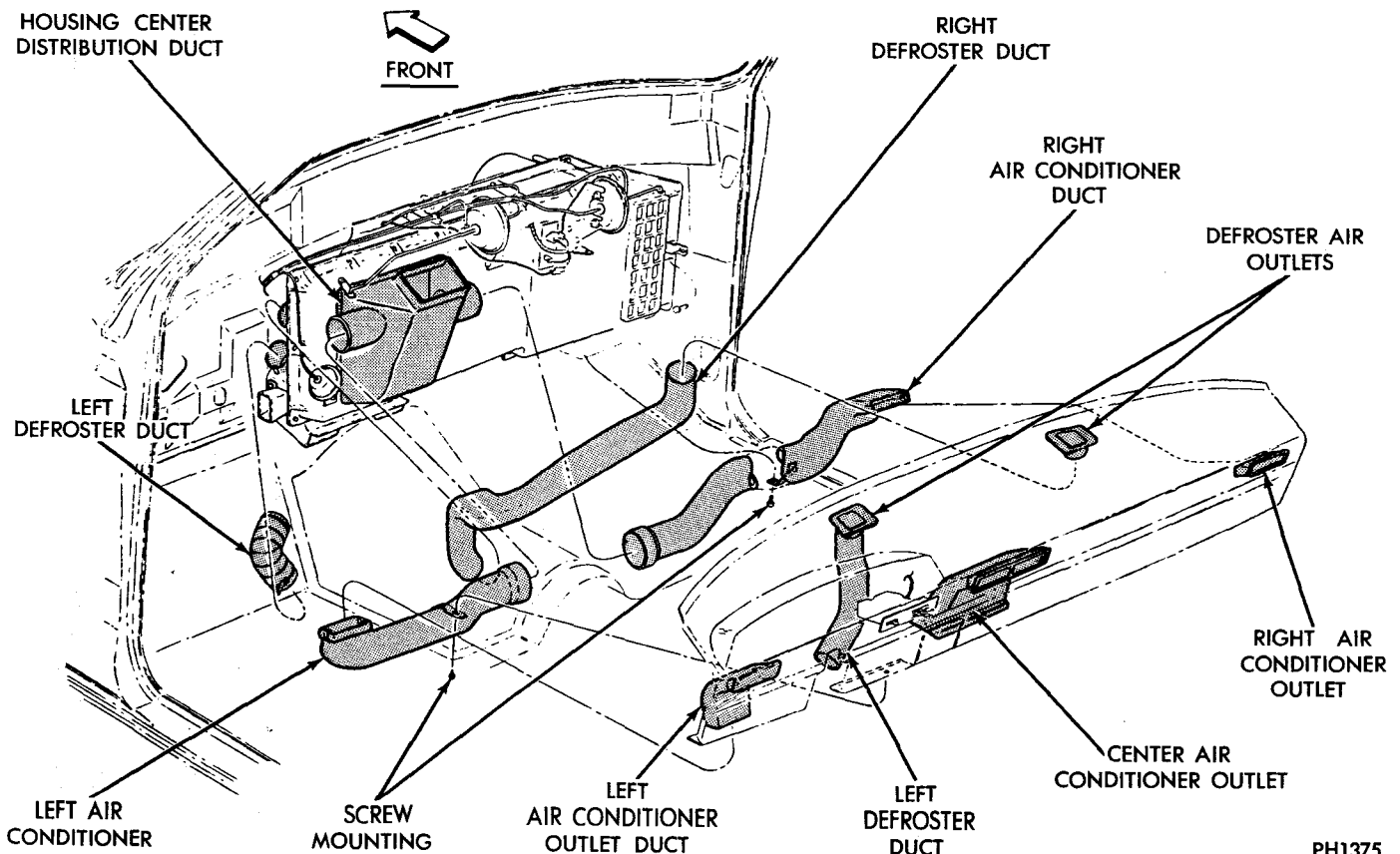


Fig. 10—Distribution Ducts and Air Outlets

(3) Install right duct mounting screw and tighten securely.

(4) Install glove box.

### Center

#### Removal

- (1) Remove center distribution duct.
- (2) Remove air outlet to panel mounting screws.
- (3) Remove air outlet.

#### Installation

- (1) Position air outlet assembly into place in panel, install mounting screws and tighten securely.
- (2) Install center distribution duct.

### Left

#### Removal

- (1) Remove left distribution duct.
- (2) Remove air outlet to panel mounting screws.
- (3) Remove air outlet assembly.

#### Installation

- (1) Position air outlet into place in panel, install mounting screws and tighten securely.
- (2) Install distribution duct.

## DEFROSTER DISTRIBUTION DUCTS (WITHOUT AIR CONDITIONING)

### Right

#### Removal

- (1) Remove glove box.
- (2) Working through glove box opening:
  - (a) Disconnect duct from air outlet.
  - (b) Disconnect duct from heater housing.
- (3) Remove duct.

#### Installation

- (1) Connect duct to heater housing and air outlet.
- (2) Install glove box.

### Left

#### Removal

- (1) Remove glove box.
- (2) Working through glove box opening remove duct from heater housing.
- (3) Working from under panel remove duct from air outlet.
- (4) Remove duct.

#### Installation

- (1) Connect duct to air outlet and heater housing.
- (2) Install glove box.

## DEFROSTER DISTRIBUTION DUCTS (WITH AIR CONDITIONING)

### Left

#### Removal

- (1) Remove left air conditioner distribution duct.
- (2) Disconnect defroster duct from housing and air outlet.
- (3) Remove duct.

#### Installation

- (1) Connect duct to air outlet and housing.
- (2) Install left distribution duct.

### Right

#### Removal

- (1) Remove housing center outlet duct.
- (2) Disconnect defroster duct from housing and air outlet.
- (3) Remove duct.

#### Installation

- (1) Connect duct to air outlet and housing.
- (2) Install housing center outlet duct.

## DEFROSTER AIR OUTLETS (Refer to Figure 6)

### Right

#### Removal

- (1) Remove glove box.
- (2) Working through glove box opening:
  - (a) Disconnect duct from outlet.
  - (b) Remove outlet to panel mounting nuts.
- (3) Remove outlet from top of panel.

#### Installation

- (1) Position outlet into place in panel, install mounting nuts, and tighten securely.
- (2) Connect duct to outlet.
- (3) Install glove box.

### Left

#### Removal

- (1) Remove instrument cluster assembly.
- (2) Working through cluster opening:
  - (a) Disconnect duct from outlet.
  - (b) Remove outlet to panel mounting nuts.
- (3) Remove outlet from top of panel.

#### Installation

- (1) Position outlet into place in panel, install mounting nuts and tighten securely.
- (2) Connect duct to outlet.
- (3) Install instrument cluster assembly.

## LIGHT BULBS (Refer to Figure 11 for Location)

**Cluster Illumination Lamps**  
**Brake Warning Indicator Lamp**  
**Turn Signal Indicator Lamps**  
**Low Oil Pressure Indicator Lamp**  
**High Beam Indicator Lamp**

### Removal

- (1) Reach up behind instrument panel and remove socket assembly from printed circuit board by turning counterclockwise.
- (2) Remove bulb from socket.

### Installation

- (1) Install bulb into socket.
- (2) Position socket assembly into opening in printed circuit board making sure locking tabs on socket are properly indexed in opening.
- (3) Turn assembly clockwise to lock into place.

**Air Gauge Illumination Lamp**  
**Clock Illumination Lamp**  
**Vacuum Gauge Illumination Lamp**  
**Tachometer Illumination Lamp**

### Removal

- (1) Reach up behind instrument panel and remove

socket assembly from gauge or clock housing by un-snapping.

- (2) Remove bulb from socket.

### Installation

- (1) Install bulb into socket.
- (2) Snap socket assembly into place in housing.

**Heater Control and Wiper Washer Switch Illumination Lamps**

### Removal

- (1) Remove wiper washer switch.
- (2) Remove bulbs from socket.

### Installation

- (1) Install bulb into socket.
- (2) Install wiper washer switch.

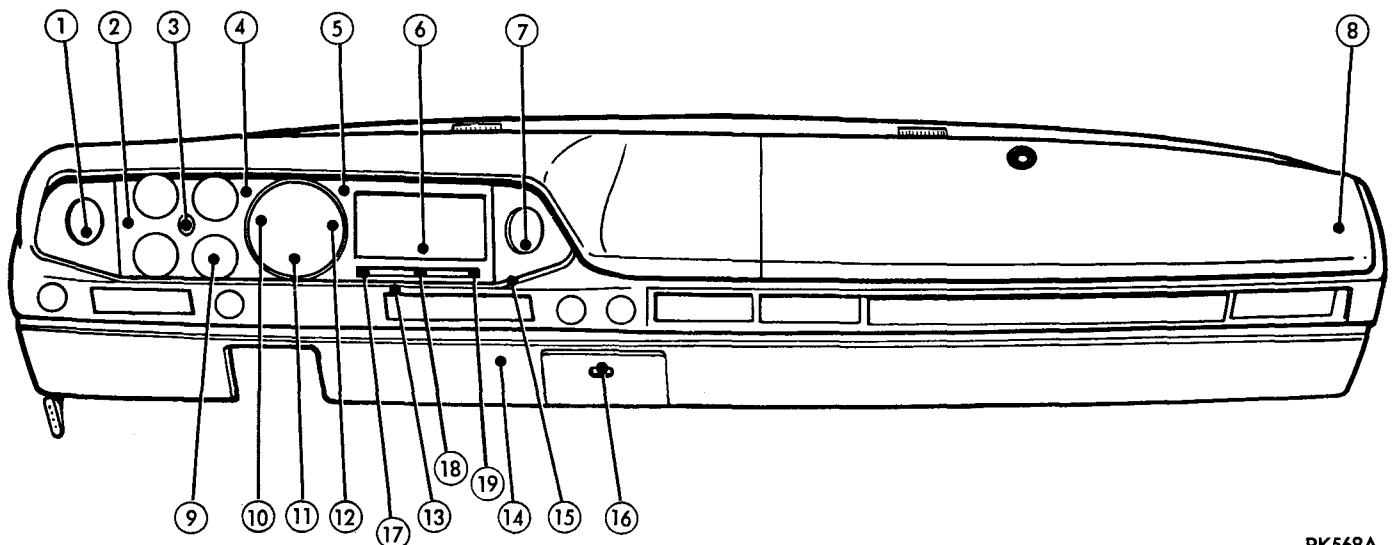
**Ash Tray Illumination Lamp**

### Removal

- (1) Remove ash tray.
- (2) Remove socket assembly from top of ash tray housing by depressing locking tabs on socket.
- (3) Remove bulb from socket.

### Installation

- (1) Install bulb into socket.
- (2) Install socket assembly by depressing locking tabs and inserting into opening in housing.



PK568A

**Fig. 11—Light Bulb Location**

### Legend For Figure 11

- |  |  |
|--|--|
| 1. Vacuum Gauge or Air Gauge or Voltmeter Gauge Illumination | 10. Left Turn Signal Indicator                           |
| 2. Cluster Illumination                                      | 11. High Beam Indicator                                  |
| 3. Brake Warning Indicator                                   | 12. Right Turn Signal Indicator                          |
| 4. Cluster Illumination                                      | 13. Heater Controls and Wiper Washer Switch Illumination |
| 5. Cluster Illumination                                      | 14. Map Lamp   |
| 6. Radio Illumination  | 15. Heater Controls and Wiper Washer Switch Illumination |
| 7. Tachometer or Clock Illumination                          | 16. Ash Tray Illumination                                |
| 8. Glove Box Illumination                                    | 17. Transfer Case Warning Light                          |
| 9. Low Oil Pressure Indicator                                | 18. Fuel Pacer   |
|  | 19. Fasten Seat Belts                                    |



### Glove Box Illumination Lamp

#### Removal

- (1) Remove glove box.
- (2) Remove bulb from socket.

#### Installation

- (1) Install bulb into socket.
- (2) Install glove box.

### Radio Illumination Lamp

#### Removal

- (1) Remove instrument cluster bezel.
- (2) From under panel remove radio to reinforcement bracket mounting nut.

- (3) Remove radio to cluster housing mounting screws.

- (4) Pull radio out from cluster far enough to gain access to lamp socket assembly.

- (5) Remove socket assembly from radio.

- (6) Remove bulb from socket.

#### Installation

- (1) Install bulb into socket.

- (2) Install socket assembly into radio.

- (3) Position radio into place in cluster housing.

- (4) Install radio to cluster housing mounting screws and tighten securely.

- (5) Install radio to reinforcement bracket mounting nut and tighten securely.

- (6) Install instrument cluster bezel.

## RADIO, SPEAKER AND ANTENNA

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## GENERAL INFORMATION

### OPERATION

#### Radio—Push Button—AM (Fig. 1)

To operate the radio, the ignition switch must be in the "On" or "Accessory" position. The operating controls consist of two knobs, a control knob controls the "On-Off" switch and volume. The control ring behind the left knob provides tone control. The right knob is the manual station selector. The five push buttons may be preset for convenient selection of popular stations.

#### Radio—Push Button—AM/FM (Fig. 2)

This radio has the same controls that are described for the AM radio above. In addition, this radio has a bar type switch that is just below the dial and above the push buttons. This bar slides to the right or left to select "AM" or "FM" reception.

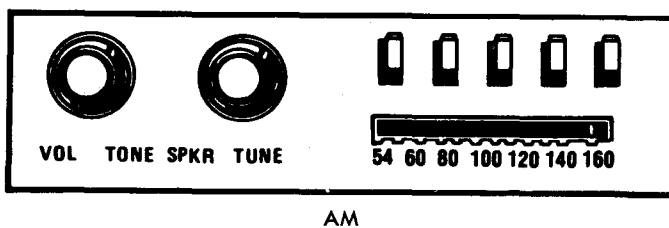
#### Push Button Operation

It is important to remember that the push button

operation is entirely mechanical and has no bearing on the radio tuning. It sets a stop so that when the button is depressed the station selector will be allowed to move to this stop. Radio performance will be directly affected by the care used in selecting these stop positions, so allow complete radio warmup and make careful manual selection of station prior to setting push button. On AM/FM radios the buttons may be used to select either AM or FM stations but not both on the same button.

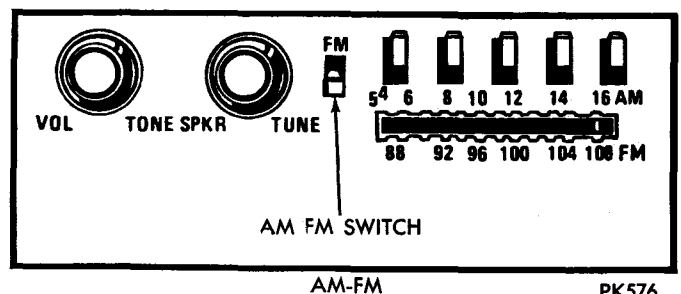
#### Push Button—Station Selection

- (1) Turn radio "on".
- (2) Pull out buttons to be set.
- (3) Carefully select the desired station.
- (4) Press in firmly on the button which you have selected for this station to lock in your choice.
- (5) After selections are all completed, test the buttons to be sure that the settings are correct.



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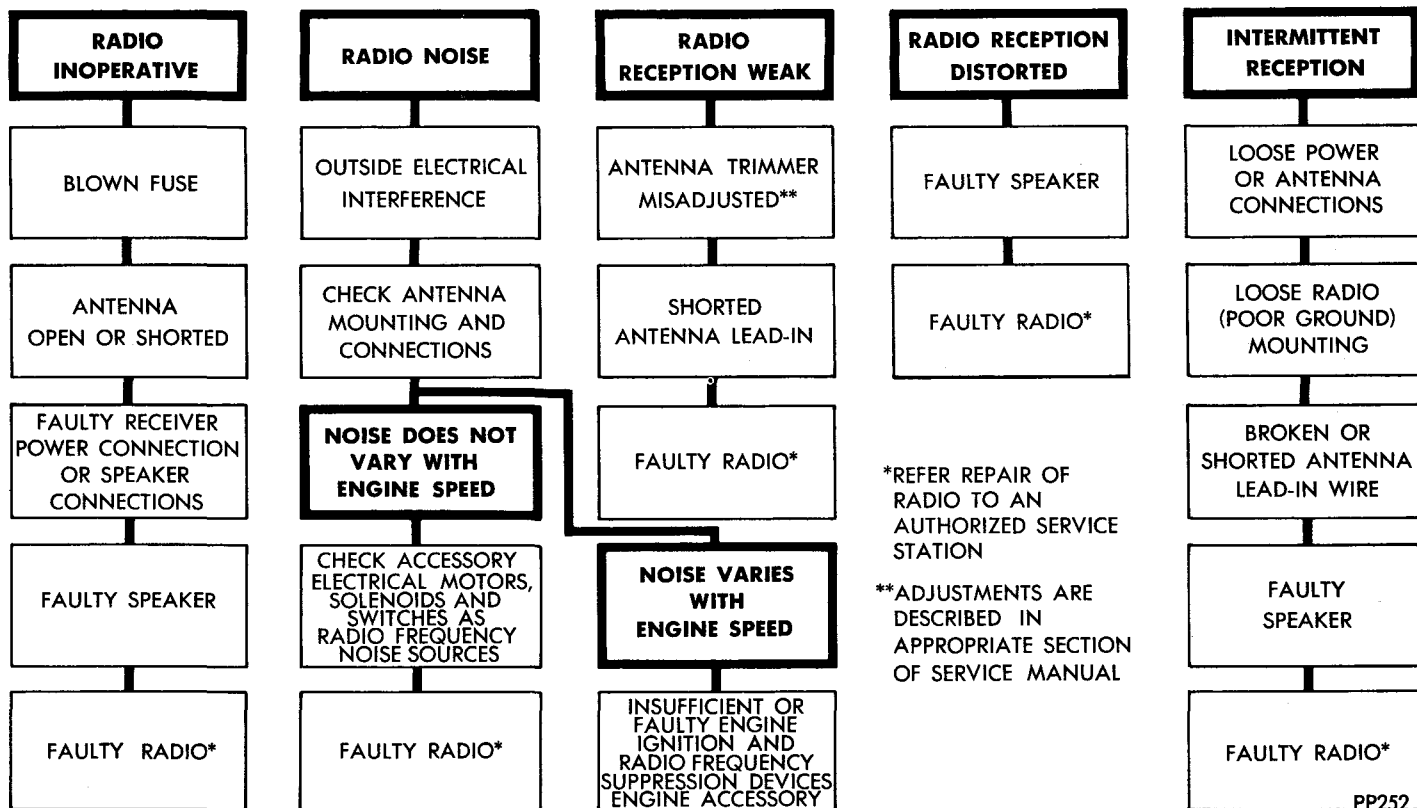
Fig. 1—Radio—AM Push Button



PK576

Fig. 2—Radio—AM/FM Push Button

### RADIO DIAGNOSIS



### SERVICE PROCEDURES

#### ANTENNA TRIMMING

All radios are trimmed at the factory and should require no further trimmer adjustment. However, whenever a radio is being installed after repair, or if verification of trimmer adjustment is desired, proceed as follows:

- (1) Operate radio for 5 minutes.
- (2) Manually tune radio to a weak signal between 1400 and 1600 KHZ on AM.
- (3) Increase radio volume to full volume and set tone control to maximum treble (fully clockwise).

Adjust antenna trimmer by carefully turning back and forth until position is found that gives peak response in volume. Maximum output indicates proper point of antenna trimmer adjustment.

#### INTERFERENCE ELIMINATION

Capacitors are used to suppress engine interference. The alternator has an internal capacitor. A capacitor is mounted on the ignition coil (Fig. 3) and two are mounted in the instrument cluster.

Radio resistance type wires in the high tension circuit of the ignition system complete the interference suppression.

If radio noises are evident, be sure the capacitor lead wires are making good contact on their respective terminals and are securely mounted. Faulty or deteriorated spark plug wires should be replaced.

If static interference is still present, connect a ground strap on the right hand and left hand sides of cab to right and left hand side of truck bed at bottom of bed. (So equipped). Also connect a ground from frame to wheel house above front spring rear mounting (both sides). Use star washers to insure a good

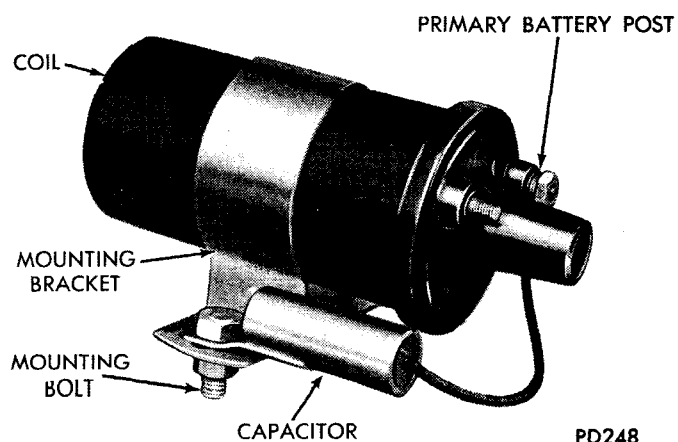


Fig. 3—Ignition Coil Capacitor

PD248

ground. Do not drill frame, use conduit hangers or existing holes.

### RADIO (Fig. 4)

#### Removal

- (1) Disconnect fusible link in engine compartment.
- (2) Remove instrument cluster bezel. Refer to Instrument Panel section of this group.
- (3) If so equipped remove left air conditioner duct.
- (4) Reach under instrument panel and disconnect antenna, electrical, and speaker leads.
- (5) Working under panel reach up and remove radio to mounting bracket mounting nut.
- (6) From front of panel, remove radio to cluster mounting bolts.
- (7) Carefully maneuver radio out through cluster housing opening.

#### Installation

- (1) Install radio into opening in cluster housing making sure stud on rear of radio goes through hole in mounting bracket.
- (2) Install radio to cluster housing mounting bolts.
- (3) Install radio to mounting bracket mounting nut.
- (4) Connect antenna, electrical, and speaker leads.
- (5) If so equipped, install left air conditioner duct.
- (6) Install instrument cluster bezel.
- (7) Connect fusible link.

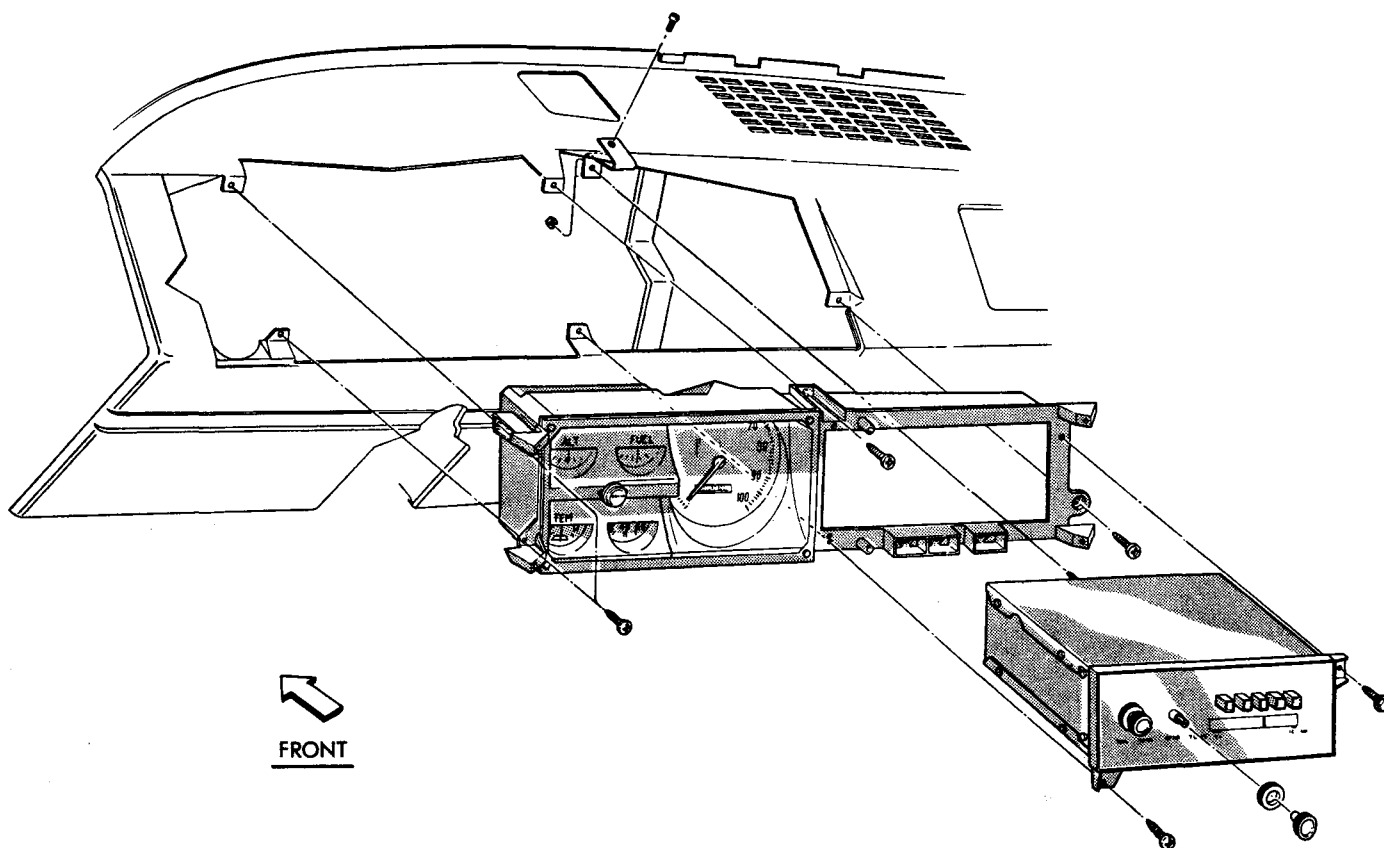
### ANTENNA D and W100, 200, 300

#### Removal

- (1) Disconnect fusible link in engine compartment.
- (2) Reach up under instrument panel and unplug antenna lead from inside of radio, (Fig. 5).
- (3) Remove glove box.
- (4) Working through glove box opening pull antenna cable from retainer clip, (Fig. 6).
- (5) Open right door and remove cable grommet from "A" post, (Fig. 7).
- (6) Pull cable from "A" post.
- (7) **Loosen** antenna mast from antenna body. **DO NOT REMOVE AT THIS TIME.**
- (8) Loosen cap nut using tool C-4085, (Fig. 8).
- (9) While holding antenna mast with one hand, remove cap nut with other hand.
- (10) Lower antenna assembly down far enough to gain access to antenna body, (Fig. 9).
- (11) While holding body remove antenna mast and reinforcement bracket.
- (12) Pull antenna body and cable assembly from fender area and remove.
- (13) Remove adapter on fender.

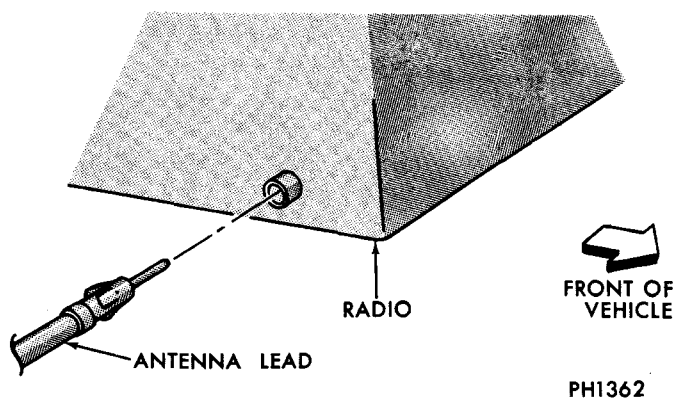
#### Installation

- (1) Route antenna cable between fender and fire-wall to "A" post area.



PK572

Fig. 4—Radio to Cluster Mounting



**Fig. 5—Unplugging Antenna Lead From Radio**

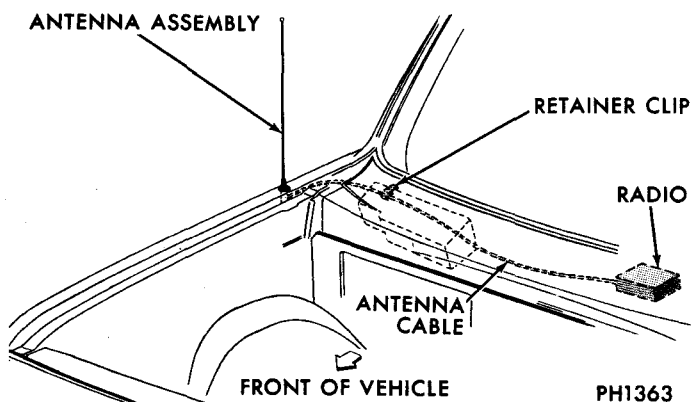
- (2) Insert reinforcement bracket on antenna body.
- (3) Insert antenna mast through hole in fender and screw into antenna body.
- (4) Pull assembly up and position into place and hold.
- (5) Working through hole in fender, turn reinforcement bracket into place. Bracket is properly positioned when index area for large tab on adapter is facing towards engine.
- (6) Install adapter making sure large tab indexes with reinforcement bracket and small tabs index with openings in fender.
- (7) Install cap nut and tighten securely with tool C-4085.
- (8) Insert cable through opening in "A" post and from inside glove box opening pull in far enough to snap grommet into place.
- (9) Route cable through retainer clip, over to radio, and plug into side of radio.
- (10) Install glove box.
- (11) Connect fusible link.

## ANTENNA D500, 600, 800, AND W600

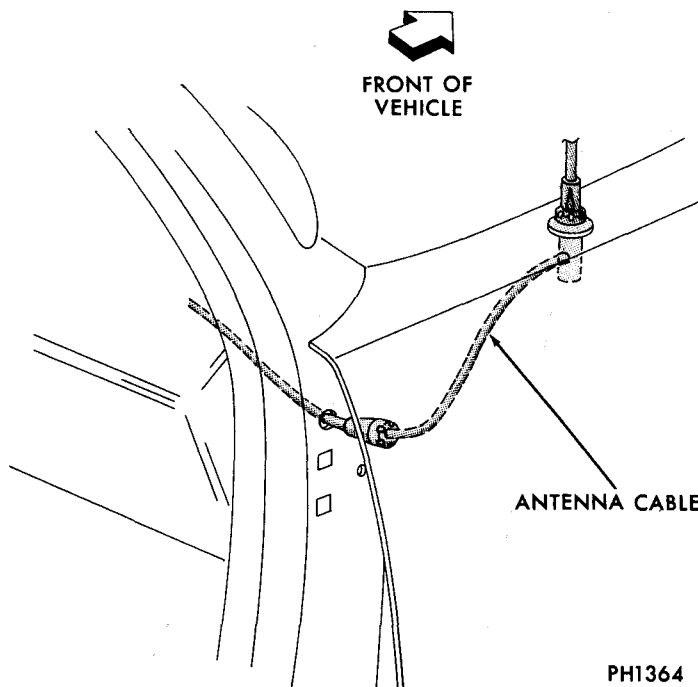
### Cable

#### Removal

- (1) Disconnect fusible link in engine compartment.
- (2) Reach up under instrument panel and unplug antenna lead from side of radio.



**Fig. 6—Removing Antenna Cable**

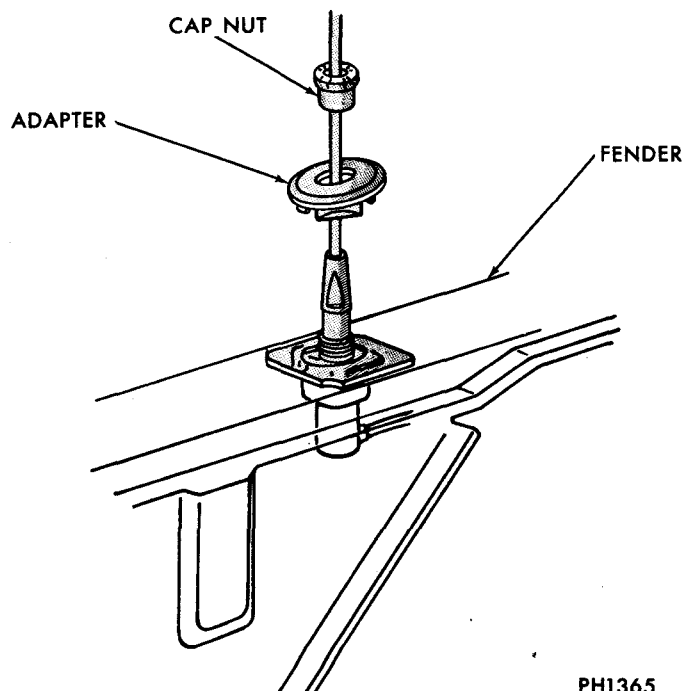


**Fig. 7—Removing Grommet**

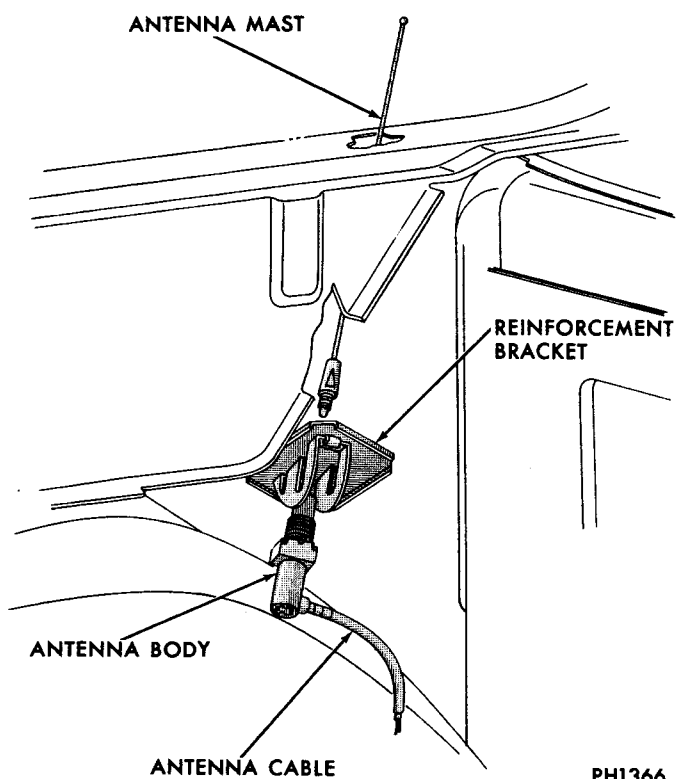
- (3) Remove glove box.
- (4) Working through glove box opening pull antenna cable from retainer clip. (Fig. 10).
- (5) Open right door and unscrew cable from antenna body.
- (6) Remove cable grommet from "A" post.
- (7) Remove cable.

#### Installation

- (1) Insert cable through opening in "A" post and



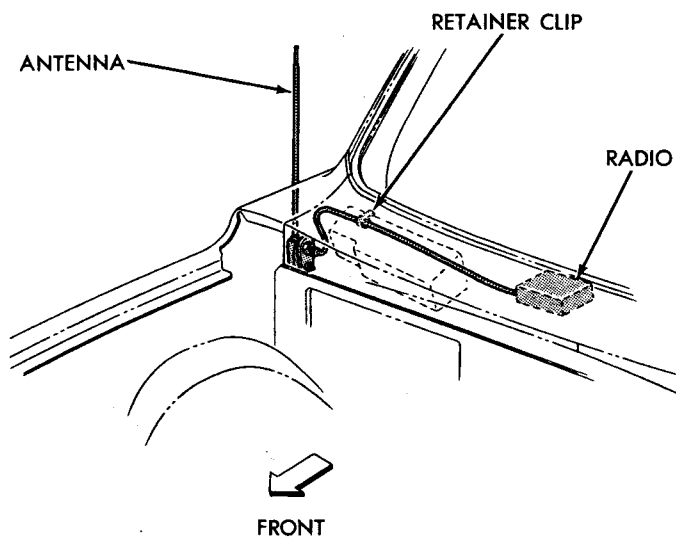
**Fig. 8—Cap Nut and Adapter**



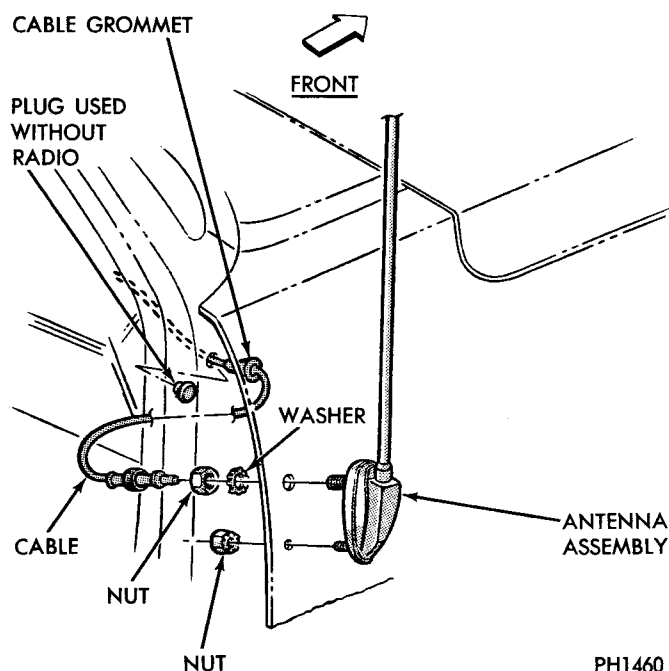
**Fig. 9—Removing or Installing Antenna Body**

from inside glove box opening pull in far enough to snap grommet into place.

- (2) Install cable to antenna assembly.
- (3) Route cable through retainer clip, over to radio and plug into side of radio.
- (4) Install glove box.



**Fig. 10—Cable Routing**



**Fig. 11—Antenna Assembly**

- (5) Connect fusible link.

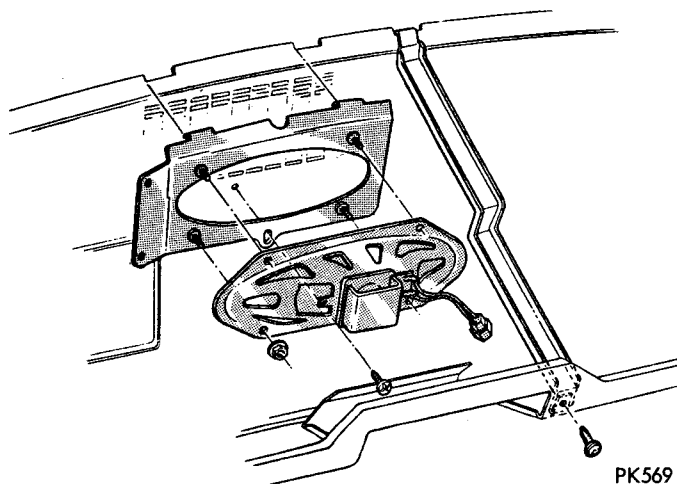
### Antenna Mast (Fig. 11)

#### Removal

- (1) Open right door.
- (2) Unscrew cable from antenna body.
- (3) Remove nuts and washers mounting antenna to fender.
- (4) Remove antenna.

#### Installation

- (1) Position antenna into place on side of fender, install mounting nuts and washers, and tighten securely.
- (2) Install cable to antenna.



**Fig. 12—Speaker Mounting**

**SPEAKER (Fig. 12)****Removal**

- (1) Disconnect fusible link in engine compartment.
- (2) If equipped with air conditioning remove center distribution duct.
- (3) Reach under instrument panel and disconnect speaker leads from wiring harness.
- (4) From under panel remove two speaker mounting nuts closest to radio.
- (5) Remove glove box.
- (6) Working through glove box opening remove

two remaining speaker mounting nuts.

- (7) Remove speaker through glove box opening.

**Installation**

- (1) Working through glove box opening, position speaker into place.
- (2) Install mounting nuts and tighten securely.
- (3) Install glove box.
- (4) Install speaker leads.
- (5) If so equipped, install center distribution duct.
- (6) Connect fusible link.

**SPEED CONTROL SYSTEM****INDEX**

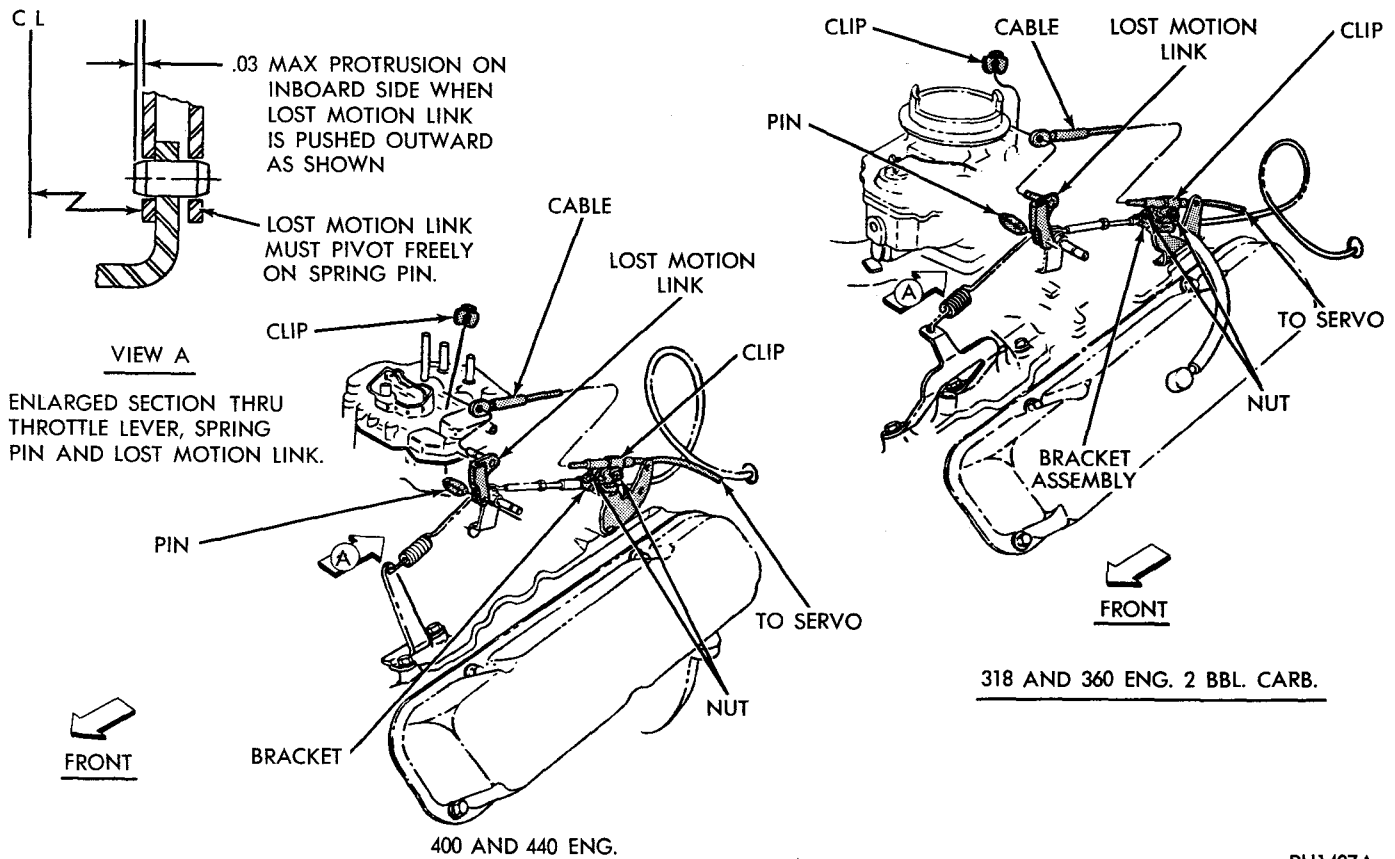
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**GENERAL INFORMATION**

The speed control system (Fig. 1) is electrically actuated and vacuum operated. The turn signal lever on the steering column incorporates a slide switch which has three positions "OFF", "ON" or "RESUME SPEED". A SPEED SET button is located in the end of

the lever. This device is designed to operate at speeds above approximately 30 M.P.H.

**WARNING:** The use of "Speed Control" is not recommended when driving conditions do not permit maintaining a constant speed, such as heavy traffic or

**Fig. 1—Speed Control**

## SPEED CONTROL SYSTEM DIAGNOSIS

**WARNING: THE USE OF "SPEED CONTROL" IS NOT RECOMMENDED WHEN DRIVING CONDITIONS DO NOT PERMIT MAINTAINING A CONSTANT SPEED, SUCH AS HEAVY TRAFFIC OR ON ROADS THAT ARE WINDING, ICY, SNOW COVERED OR SLIPPERY**

SET BRAKES, PLACE TRANSMISSION IN NEUTRAL OR PARK. START ENGINE.

RELEASE BRAKES AND ACCELERATE VEHICLE TO DESIRED SPEED.

MOVE SLIDE SWITCH TO "ON" POSITION.

**SPEED CONTROL ENGAGES WHEN ENGINE IS STARTED, OR DOES NOT DISENGAGE WHEN BRAKE PEDAL IS DEPRESSED.**

FAULTY ELECTRICAL CIRCUIT.\*

**SPEED CONTROL ENGAGES WITHOUT ACTUATING THE "SPEED SET" BUTTON**

FAULTY ELECTRICAL CIRCUIT\*

DEPRESS AND RELEASE "SPEED SET" BUTTON.

REMOVE FOOT FROM ACCELERATOR. SPEED SHOULD BE CONTROLLED

**NO SPEED CONTROL WHEN BUTTON IS PRESSED**

SLIDE SWITCH IN "OFF" POSITION.

FUSE BLOWN

VACUUM LEAK.

SPEED CONTROL THROTTLE CABLE DISCONNECTED.

IMPROPER STOP LAMP AND SPEED CONTROL SWITCH ADJUSTMENT.\*

FAULTY ELECTRICAL CIRCUIT.\*

**SPEEDOMETER NOISE, EXCESSIVE NEEDLE WAIVER OR ERRATIC SERVO LOCK-IN PERFORMANCE**

SPEEDOMETER CABLE KINKED OR DAMAGED.

CABLE CORE BENT OR TOO LONG.

CABLE FERRULE NUT LOOSE AT SPEEDOMETER HEAD, TRANSMISSION OR SPEED CONTROL SERVO.

NOISY SPEEDOMETER HEAD ASSEMBLY.

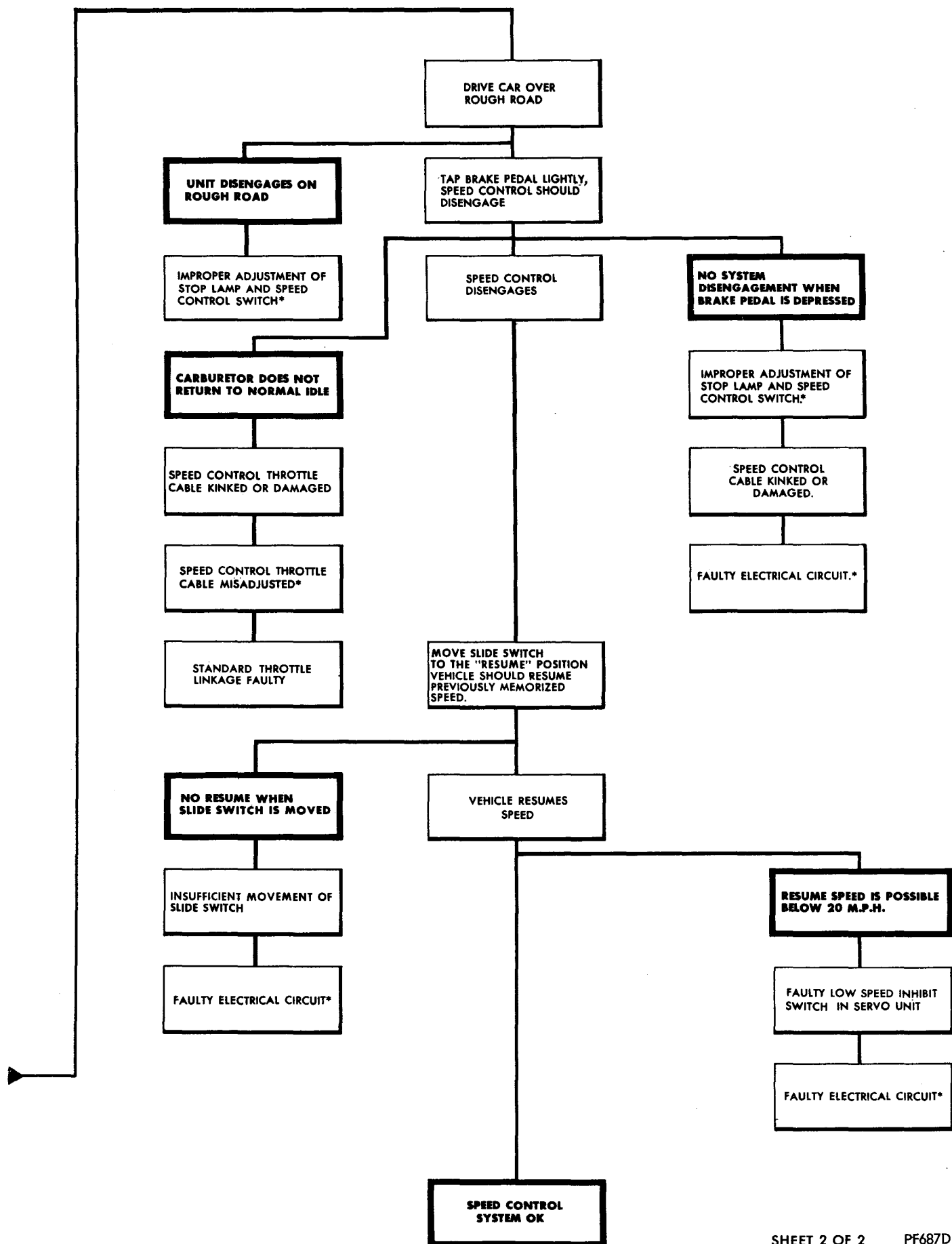
**SPEED SETTING AFTER LOCK-IN, TOO HIGH OR TOO LOW.**

IMPROPER ADJUSTMENT OF SPEED CONTROL THROTTLE CABLE\*

VACUUM LEAK.

IMPROPER SPEED-CONTROL SERVO LOCK-IN ADJUSTMENT.\*

\*TESTS AND ADJUSTMENTS ARE DESCRIBED IN APPROPRIATE SECTION OF SERVICE MANUAL.





on roads that are winding, icy, snow covered or slippery.

**TO ENGAGE:** Move slide switch to the "ON" position, attain desired speed then momentarily depress and release "SPEED SET" button establishing speed memory and engaging system. Remove foot from accelerator. Speed will be maintained at this level. Moving the slide switch from "OFF" to "ON" while the vehicle is in motion establishes memory without system engagement at that speed.

**TO DISENGAGE:** Normal brake application or a soft tap on the brake pedal will disengage control unit without erasing speed memory. Moving the slide switch to the "OFF" position or turning the ignition "OFF" also disengages the system and in addition erases the speed memory.

**TO RESUME:** Momentarily move slide switch to the

"RESUME" position. Vehicle will resume to the previously memorized speed.

**TO VARY SPEED SETTING:** To increase speed, depress accelerator to desired speed and momentarily depress and release SPEED SET button. When speed control unit is engaged, tapping SPEED SET button may increase speed setting incrementally.

To decrease speed, tap brake pedal lightly disengaging system. When desired speed has been obtained depress and release SPEED SET button. Decrease in speed can also be attained by holding set button depressed until desired speed is attained. Releasing the button engages the system at that speed.

**TO ACCELERATE FOR PASSING:** Depress accelerator as needed, when passing is completed, release accelerator and vehicle will return to previous speed setting.

## SERVICE PROCEDURES

### SERVO LOCK-IN SCREW ADJUSTMENT

The Lock-in Screw Adjustment (Fig. 2) controls the accuracy of the speed control unit. When the SPEED-SET button is depressed and released at speeds above approximately 30 M.P.H.; the speed control system is activated, the system "locks in" and should hold the vehicle at virtually the same speed at which it is traveling.

**IMPORTANT:** Lock-in accuracy will be affected by:

- (a) Poor engine performance (need for tune-up etc.)
- (b) Power to weight ratio (loaded gross weight of vehicle; trailering).
- (c) Improper slack in throttle control cable, (See "Throttle Control Cable Adjustment").

This screw should never be adjusted indiscriminately. Need for adjustment can be determined only after accurate diagnosis of the Speed Control System operation.

After the steps (a) (b) and (c) have been considered and speed "sags" (drops) more than 2 to 3 M.P.H. when speed control is activated, the lock-in adjusting screw should be turned counter-clockwise (approximately 1/4 turn per one M.P.H. correction required).

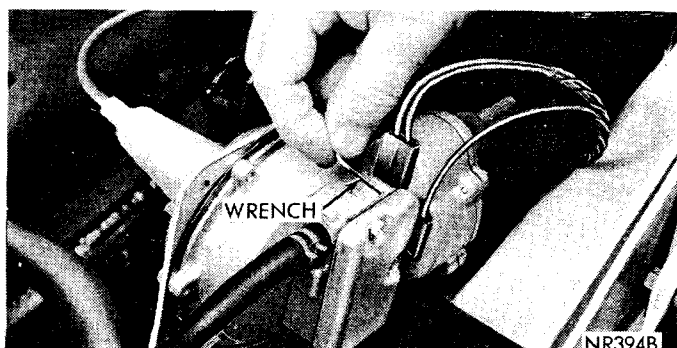


Fig. 2—Lock-In Screw Adjustment

If "Pull-up" (speed increase) of more than 2 to 3 M.P.H. occurs, the lock-in adjusting screw should be turned clockwise (approximately 1/4 turn per one M.P.H. correction required. If the screw is loose, stake side of servo housing adjacent to screw to INSURE a snug fit.

**CAUTION:** This adjustment must not exceed two turns in either direction or damage to unit may occur.

### SPEED CONTROL THROTTLE CABLE ADJUSTMENT

Optimum servo performance is obtained with a given amount of free play in the throttle control cable. To obtain proper free play remove spring clip and insert a 1/16 inch diameter pin between forward end of slot in cable and carburetor linkage pin. (Fig. 3). With choke in full open position and carburetor at curb idle, pull back on cable (toward dash panel)

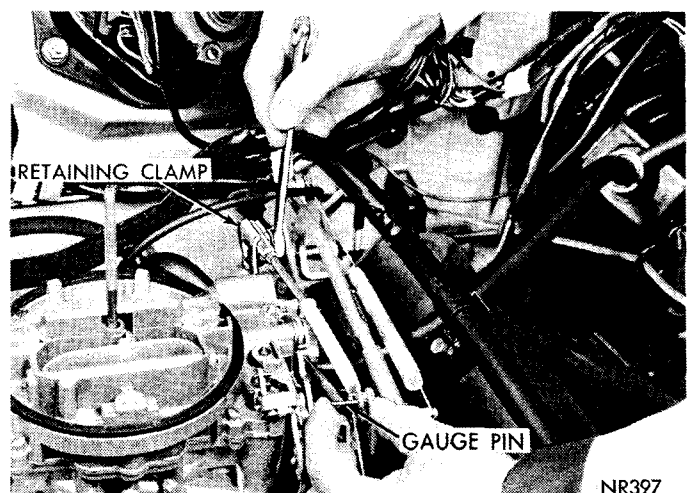


Fig. 3—Servo Throttle Cable Adjustment

without moving carburetor linkage until all free play is removed. Tighten cable clamp nut to 45 inch-pounds, remove 1/16 inch diameter pin and install hair pin clip.

## STOP LAMP AND SPEED CONTROL SWITCH ADJUSTMENT

Refer to Group 5, Brakes, Stop Lamp Switch Adjustment.

## ELECTRICAL TESTS

Refer to "Speed Control Wiring Diagram", (Fig. 7). It is suggested that the electrical tests be made in the following sequence:

- (1) **Check accessory fuse for continuity.**
- (2) **Speed control switch (turn signal lever) test.**
  - (a) Disconnect the four wire electrical connector at the steering column.
  - (b) Connect a twelve volt positive source to the black wire terminal in the speed control harness connector (male).
  - (c) With the slide switch in the **ON** position, attach one lead of a test lamp to the connector yellow wire, other lead to a good ground; test lamp should light and should go off when the "Speed Set" button is depressed.
  - (d) Move the test lamp to the connector blue wire; test lamp should light and should go off when the slide switch is turned to the **OFF** position.
  - (e) With the slide switch in the **ON** position, move test lamp lead to the connector white wire; test lamp should light by either depressing the Speed Set button or by moving the slide switch toward the "Resume" position.
  - (f) Reconnect speed control lever harness connector to wiring harness connector.
- (3) **Stop lamp and speed control switch test:**
  - (a) Disconnect the double connector at the switch pigtail and connect a twelve volt source to either terminal and connect a test lamp from other terminal to a good ground: test lamp should light when brake pedal is in the normal position and should go off when the brake pedal is depressed to a maximum of approximately one half inch after proper adjustment as outlined under "Stop Lamp and Speed Control Switch Adjustment".
  - (b) Remove test lamp and reconnect pigtail connector to harness connector.
- (4) **Servo unit tests:**
  - (a) **Locking coil test;** turn ignition to the **Accessory** or **ON** position and move the slide switch to the **ON** position.
  - (b) Momentarily disconnecting and connecting the double connector at the servo terminals should produce a clicking sound in the servo. Replace the servo if no clicking sound is heard.
  - (c) **Holding coil and Low Speed switch test;** with-

out removing either connector at servo, place a test lamp probe to the black (with tracer) wire terminal of servo, other probe to a good ground. Block front wheels; raise rear wheels and drive rear wheels to 35 miles per hour; with speed control slide switch in the **ON** position, depress and release "Speed Set" button. The speed should increase above 35 miles per hour and the test light should remain **ON** until the brake pedal is depressed to disengage the system and test light should go **off**.

- (d) Remove test lamp.

## SPEED CONTROL SERVO

### Removal

- (1) Remove two nut and washer assemblies attaching the servo cable cover to servo housing. Pull cover away from servo to expose cable retaining clip (Fig. 4) and remove clip attaching cable to servo diaphragm pin.
- (2) Disconnect speedometer and transmission drive cables at the servo housing.
- (3) Disconnect the vacuum hose at servo housing (Fig. 5) and electrical connectors.
- (4) Remove servo from mounting bracket (two nut and washer assemblies).

### Installation

- (1) Position servo on mounting bracket studs and install attaching nuts. Tighten to 110 inch-pounds.
- (2) Install vacuum hose and clamp. Make sure the hose clamp is locked securely.
- (3) Connect speedometer and transmission drive cables at servo.
- (4) With throttle in full open position, align throttle cable to servo pin and install retaining clip.
- (5) Install cable cover on servo studs and install attaching nuts. Tighten to 32 inch-pounds torque.
- (6) Install electrical connectors at servo.

## SERVO THROTTLE CABLE ASSEMBLY (Servo to Carburetor)

### Removal

- (1) Remove air cleaner.
- (2) Disconnect cable at retaining clamp and at carburetor lost motion link by removing spring clip.

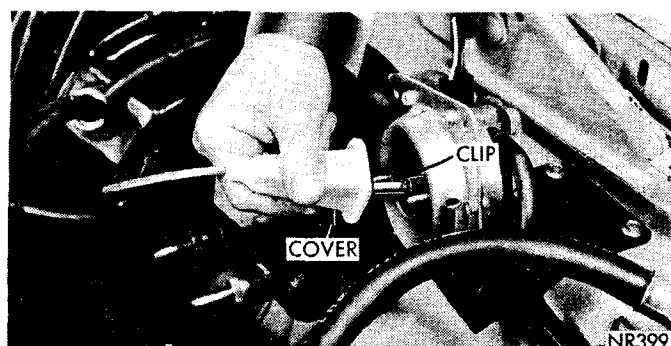
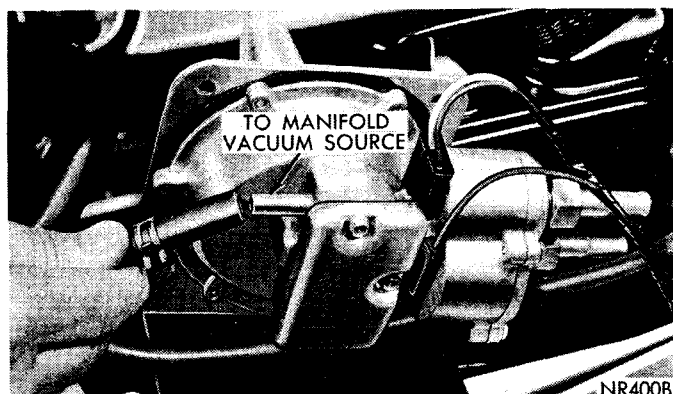


Fig. 4—Removing or Installing Throttle Cable Cover



**Fig. 5—Removing or Installing Servo Hose**

(3) Disconnect cable at servo (Fig. 4) and remove cable assembly.

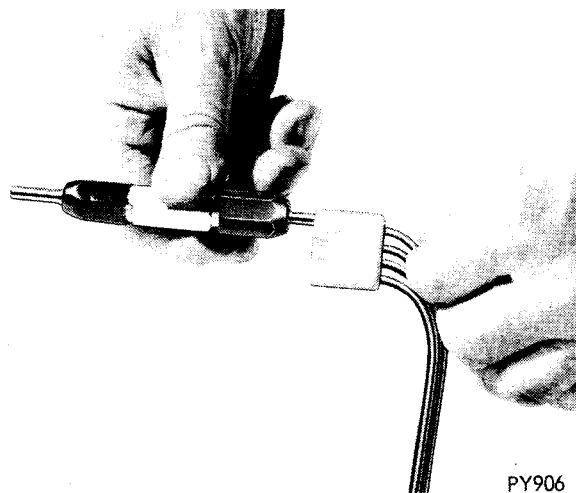
### Installation

(1) Locate cable through routing bracket on master cylinder studs.

(2) Connect cable at servo housing; tighten nuts to 32 inch-pounds torque.

(3) Route cable through retaining clamp, leave nut loose and connect at carburetor lost motion link lever pin.

(4) Adjust cable free play as described under "Speed Control Throttle Cable Adjustment".



**Fig. 6—Removing Wire Terminals**

### SPEED CONTROL SWITCH (Turn Signal Lever)

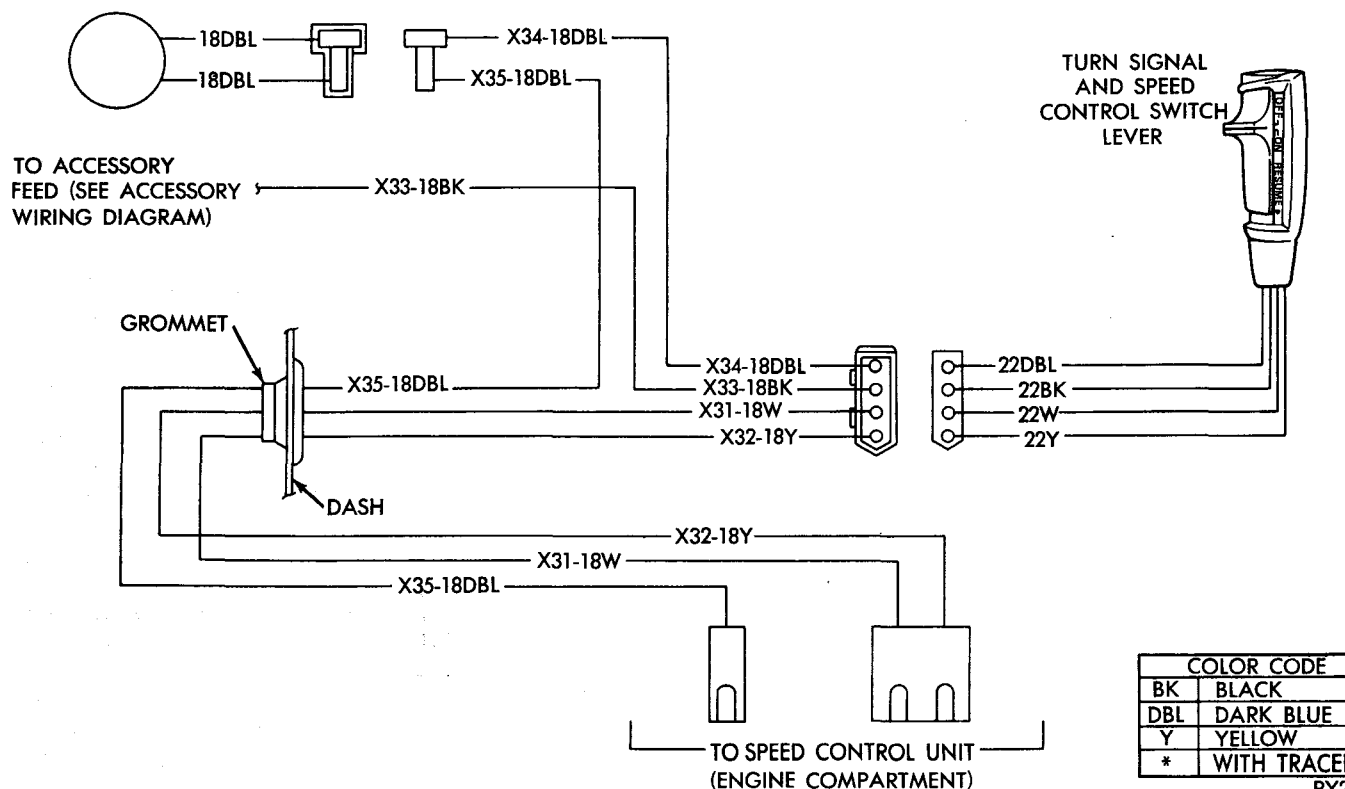
#### Removal

(1) Disconnect battery negative terminal at battery negative post and speed control connector at lower end of column.

(2) Remove steering wheel. See Group 19 "Steering".

(3) Remove turn signal switch and lever attaching screw.

STOP LAMP AND  
SPEED BRAKE SWITCH



**Fig. 7—Speed Control Wiring Diagrams**

(4) Remove steering column cover plate, to facilitate reaching the lower end of speed control switch lead wires and remove wires and terminals from connector with Wire Harness Tool C-4135, (Fig. 6).

(5) Tape terminals and pull lever and wires out.

### Installation

(1) With a guide wire thread the harness through the opening in column. **Make guide wire long enough so that it can be reached at bottom of column before harness is attached to the upper hook.** When harness has been pulled through, install terminal clips into

switch connector and connect to harness connector.

**CAUTION: Check color coding of wires to insure they are installed in the proper cavity. (See Figure 7.)**

(2) Install harness trough and steering column cover plate.

(3) Install turn signal lever (speed control lever switch) attaching screw.

(4) Install steering wheel, steering column cover plate. See Group 19 "Steering".

(5) Connect battery negative terminal at battery negative post.

(6) Test operation of speed control system.

## EXTERIOR LIGHTING

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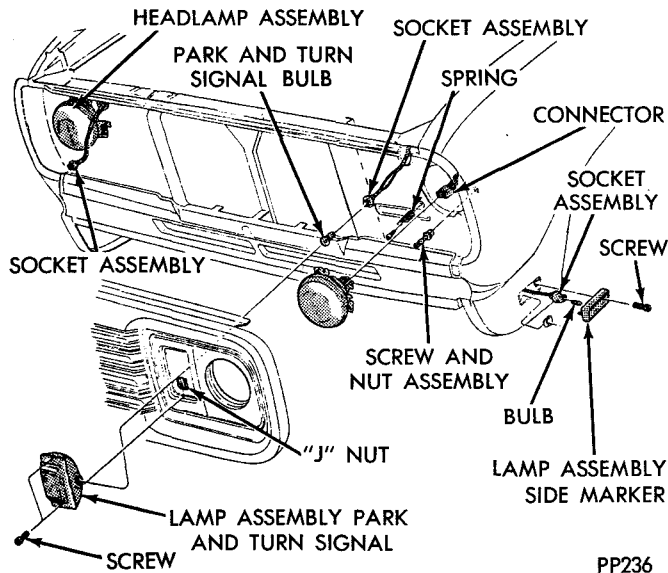
### GENERAL INFORMATION

Each vehicle is equipped with various lamp assemblies which are used for illuminating and/or indicating purposes. Their locations vary depending on model and body applications. Lamps shown in Figures 1 through 8 are standard or optional equipment installed at time of assembly. If a vehicle is

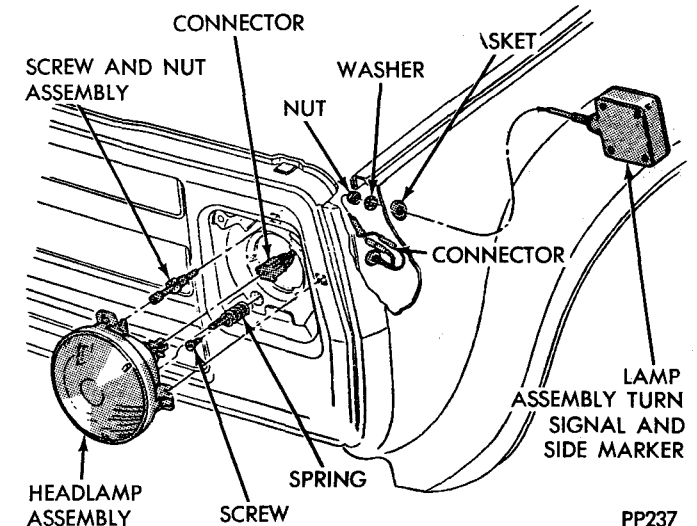
equipped with a body installed by an outside body builder, refer to that body builders service manual for lighting information.

### EXTERIOR LAMPS

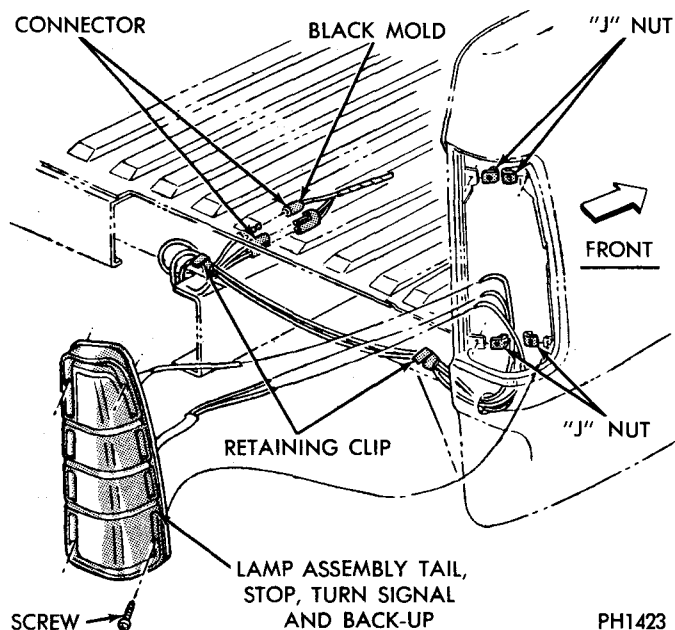
Should there be need to remove lamps refer to Figures 1 through 8 for details.



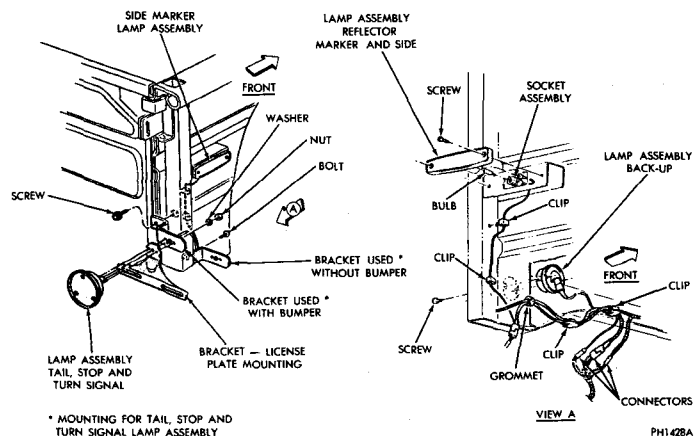
**Fig. 1—Headlamp, Sidemarker, Park and Turn Signal Lamp D and W 100-200-300**



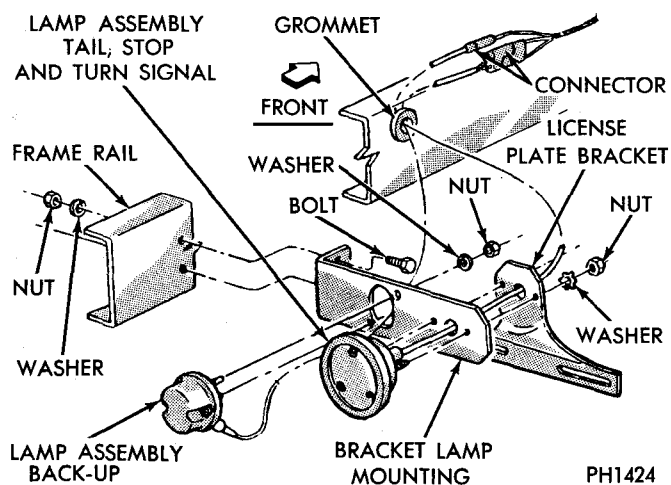
**Fig. 2—Headlamp, Sidemarker, and Turn Signal Lamp D-500-600-700-800 and W600**



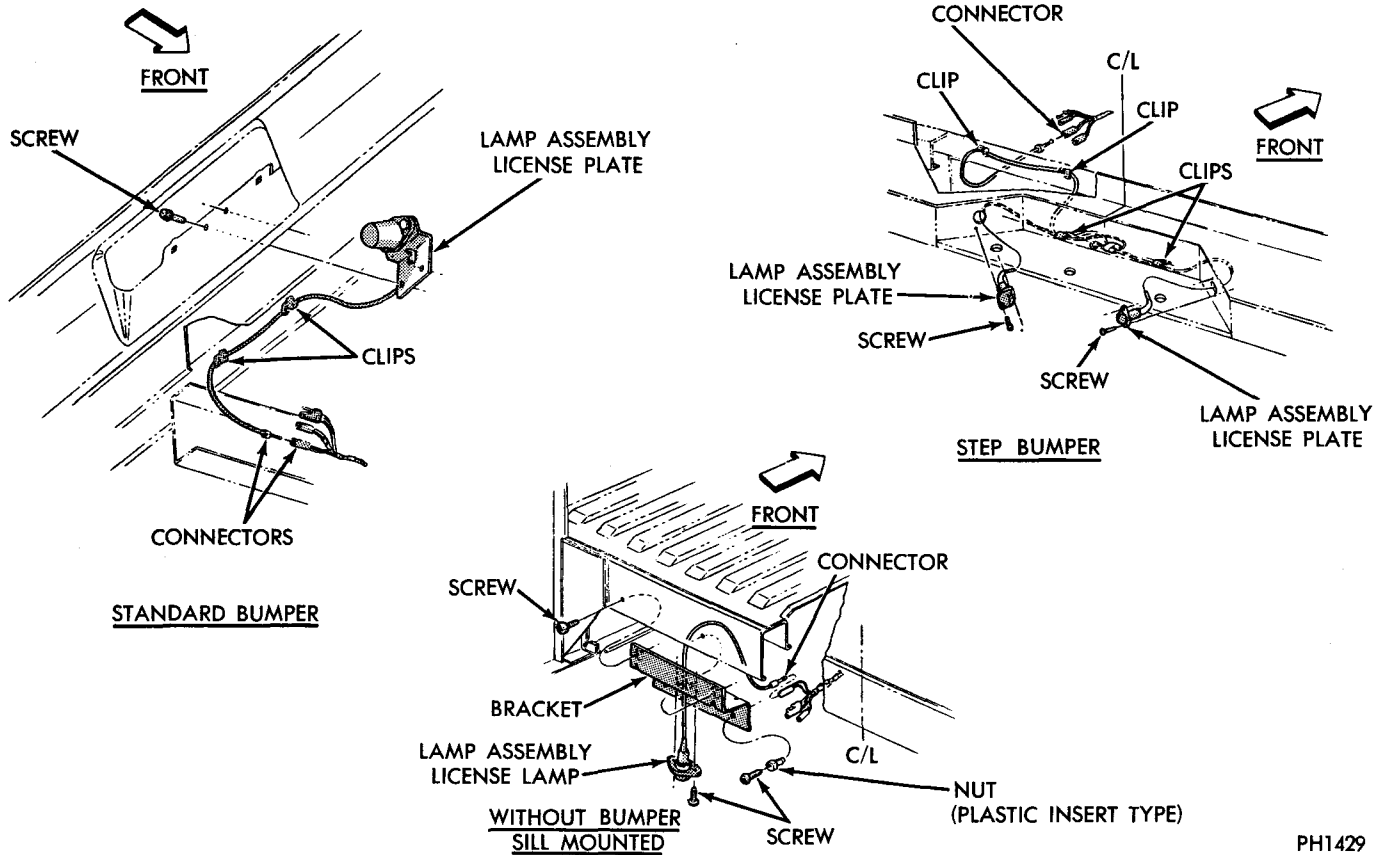
**Fig. 3—Tail, Stop, Turn Signal Lamp, and Back-Up Lamp D and W 100-200-300 Sweptline Models**



**Fig. 5—Tail, Stop, Turn Signal, and Back-Up Lamp D and W 100-200-300 Utiline Models**

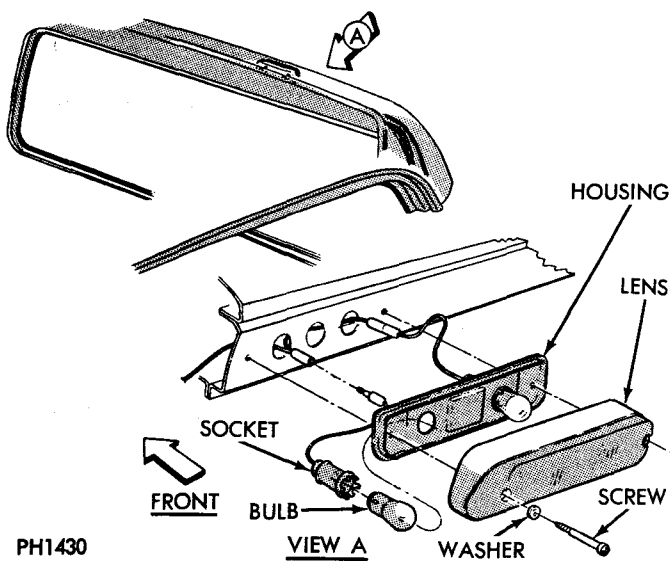


**Fig. 4—Tail, Stop, Turn Signal, and Back-Up Lamp D and W 100-200-300-500-600-700-800 Cab and Chassis**



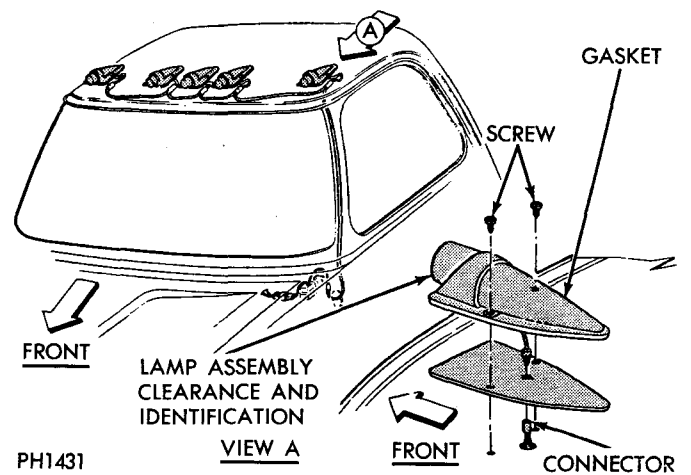
PH1429

**Fig. 6—License Plate Lamps D and W 100-200-300 Sweptline and Utiline Models**



PH1430

**Fig. 7—Cargo Lamp (Optional) D and W 100-200 Sweptline and Utiline Models**



PH1431

**Fig. 8—Clearance and Identification Lamps All Models Where Applicable**

## HEADLIGHT ADJUSTMENT

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Sealed Beam Replacement .....	Page 103
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Visual Headlamp Adjustment .....	103

## GENERAL INFORMATION

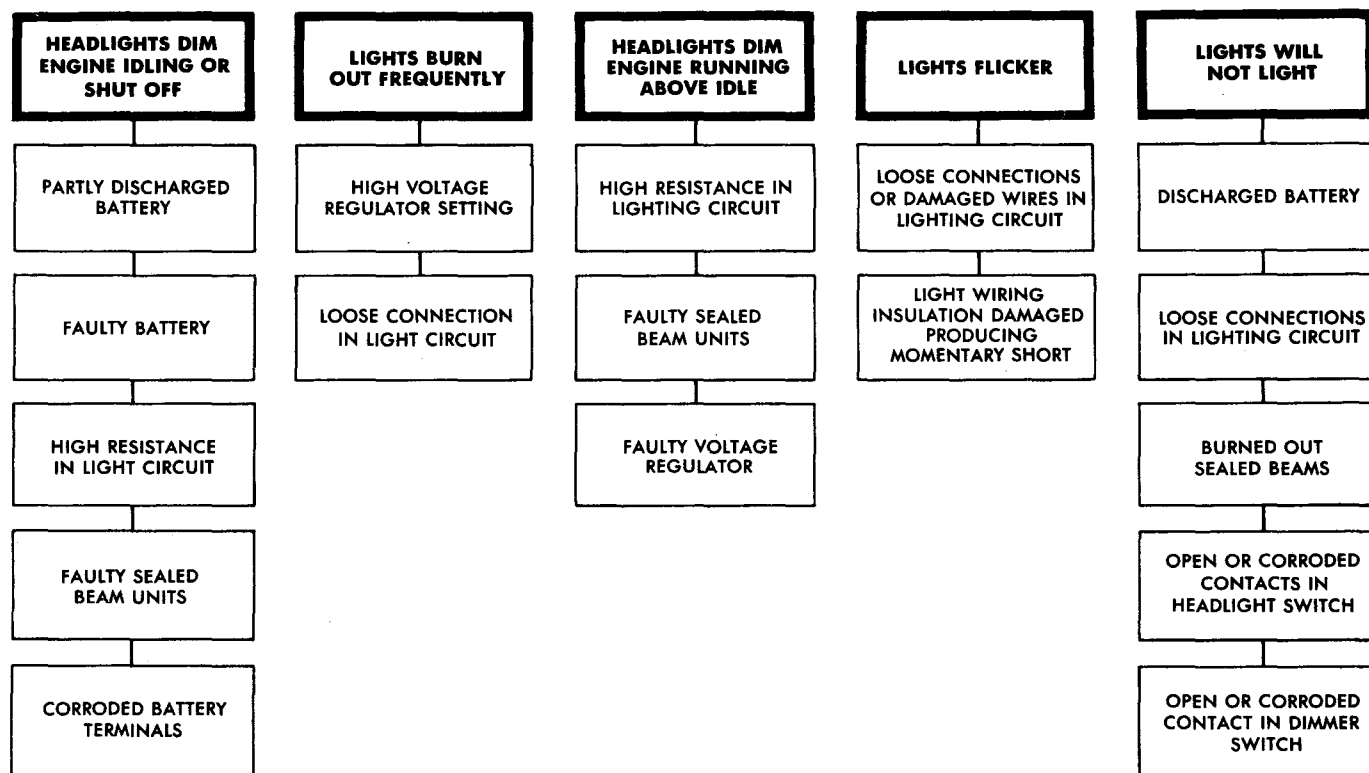
The headlight system consists of two sealed beam bulbs. The bulbs are the two filament type for low and high beam and are marked by a number 2 molded in the lens.

The low beam is intended for use in congested areas and on highways when meeting other vehicles within a distance of 500 feet. The high beam is intend-

ed primarily for distant illumination and for use on the open highway when not meeting other vehicles.

Manual on and off operation is controlled by a switch mounted on the instrument panel while manual operation of the high-low beam is controlled with a foot operated dimmer switch mounted on the left side of the floor pan.

## HEADLAMP DIAGNOSIS



## SERVICE PROCEDURES

### PRE-AIMING INSTRUCTIONS

- (1) Test dimmer switch operation.
- (2) Observe operation of high beam indicator light mounted in instrument cluster.
- (3) Inspect for badly rusted or faulty headlight assemblies. These conditions must be corrected before a satisfactory adjustment can be made.
- (4) Place vehicle on a level floor.
- (5) Inspect tire inflation.
- (6) Remove each headlight trim panel. Do not remove sealed beam retainer rims.
- (7) Thoroughly clean headlight lenses.

### COMPENSATING THE AIMERS

- (1) Place transit on floor in line with vertical centerline of right front wheel (Fig. 9). Place split image target in like position at right rear wheel.
- (2) Adjust range screw on transit until target split image coincides or merges into one unbroken line. **Make sure that the line of sight is perpendicular from the eye to the viewing port of the transit and that the target image is centered in viewing port of transit.**
- (3) Turn dial on side of transit until bubble in spirit level is centered.
- (4) When bubble is centered, note "plus" or "minus" reading on compensator scale. This figure indicates degree of slope of floor and must be transferred to each aimer.
- (5) With a screw driver, turn adjusting slot of floor level compensator in each aimer, until correct plus or minus figure (or fractional part) appears in proper window, (Fig. 10).

### TESTING AIMER CALIBRATION (Fig. 11)

- (1) Using carpenter or stone mason level of known accuracy, locate a true vertical plate glass window or smooth surface.

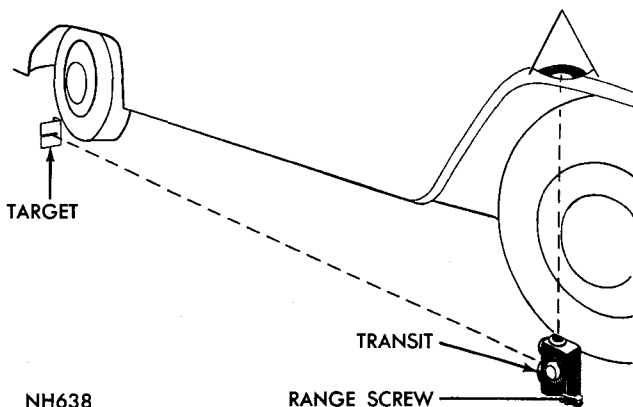


Fig. 9—Determining Slope of Floor

- (2) Set **DOWN-UP** pointer on **DOWN O**.
- (3) Set **RIGHT-LEFT** pointer and floor level compensator at "O".
- (4) Secure aimers to glass or smooth surface three to five feet apart so split image targets can be located in viewing ports.
- (5) If bubble is centered in glass dial, vertical calibration is correct. If bubble is not centered, make **DOWN-UP** adjustment by rotating level adjusting screw until bubble is centered in spirit level.
- (6) The horizontal aim is correct if targets on opposite aimers are aligned in viewing ports. If targets are not aligned in viewing ports, rotate mirror adjusting screw until target split image becomes aligned.

### MOUNTING AND ADJUSTING THE AIMERS

- (1) While holding an aimer in alignment with lens of headlight bring aimer up to and against headlight lens. **Make certain that headlight lens pads are making full contact with aimer mounting flange and that aimer target is facing inboard.**
- (2) Push release lever forward (to expel air from suction cup) and while holding aimer firmly against headlight aiming pads, slowly pull release lever back until spring lock engages in the slot, (Fig. 12).
- (3) Mount second aimer on other side of vehicle; in same manner.
- (4) On each aimer, set pointer to number 0 on **DOWN** side of the **DOWN-UP** scale.
- (5) On each aimer, position the pointer, of the **RIGHT-LEFT** scale, at 0 cross-out right.

### MEASURING HEADLIGHT AIM

#### Horizontal Test

Turn the **RIGHT-LEFT** scale knob until the split image is in alignment. If the **RIGHT** or **LEFT** POR-

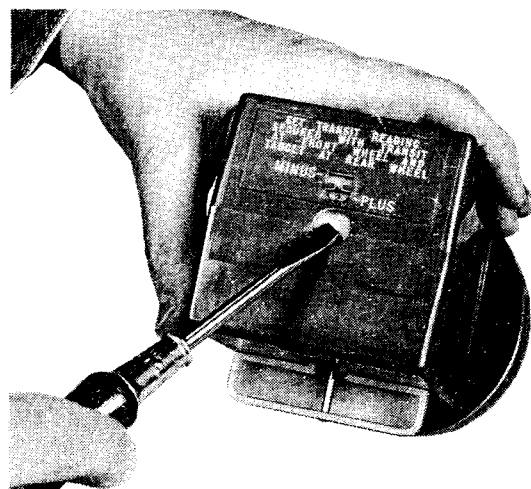
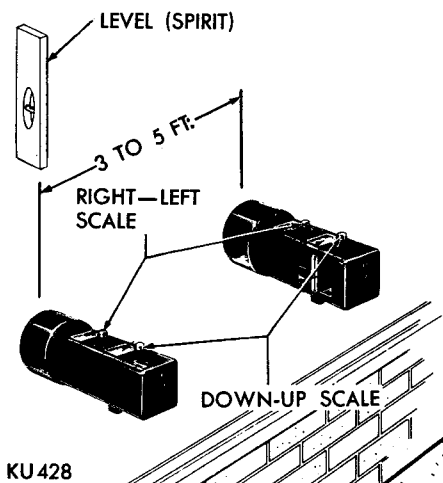


Fig. 10—Adjusting Floor Level Compensators





**Fig. 11—Checking Aimer Calibration**

IF the deviation of scale exceeds the following values, the lights should be aimed.

Values given represent inches at 25 feet.

	Left	Right
No. 2 Unit .....	4	4

### Vertical Test

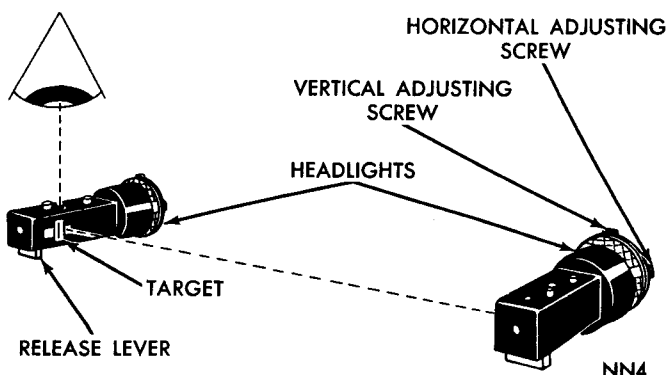
Turn **DOWN-UP** scale knob until the spirit level is centered. If **DOWN** or **UP** portion of the scale exceeds the following values, the lights should be aimed.

	Up	Down
No. 2 Unit .....	4	4

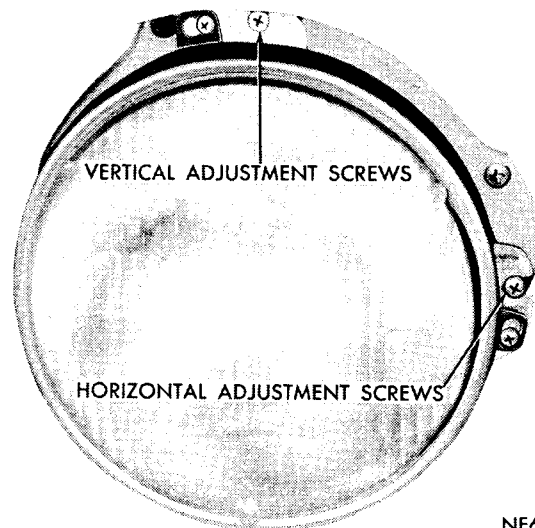
### Horizontal Adjustment

(1) With pointer of **RIGHT-LEFT** scale still set at 0, sight through aimer viewing port. **Make sure that line of sight is perpendicular from eye to viewing port of aimer and that target image is centered in viewing port of aimer.**

(2) While sighting through viewing port of aimer, turn horizontal adjusting screw on headlight until split target image line merges into one unbroken line. To remove backlash, be sure to make a final adjustment by turning headlight horizontal adjusting screw in a clockwise direction, (Fig. 13).



**Fig. 12—Mounting and Adjusting Aimers**



**Fig. 13—Headlamp Adjustment Points**

(3) Make horizontal adjustment on other side of vehicle in same manner.

### Vertical Adjustment

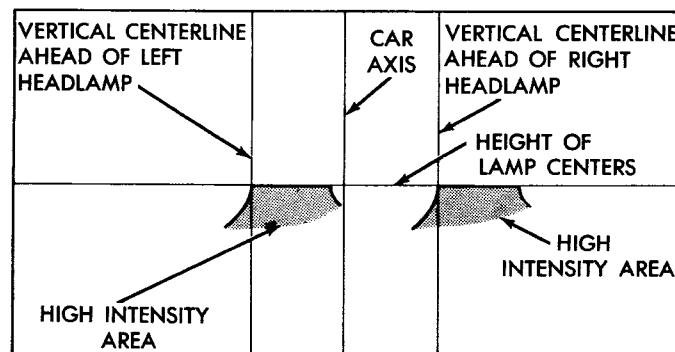
(1) Turn vertical adjusting screw on headlight in counterclockwise direction to bring bubble of spirit level on aimer to vehicle side of center. Use care to avoid disturbing installed position of aimers. Then turn screw clockwise until bubble is centered for correct aim and elimination of backlash.

(2) Make vertical adjustment on other side of vehicle in same manner.

(3) Inspect target alignment on each side and readjust the horizontal aim, if necessary.

**Remove aimers by releasing spring lock at rear (bottom) of aimers and pushing release lever forward. Do not attempt to remove the aimers by pulling away from headlight lens—slide suction cup downward and away from lens.**

(4) Install headlight trim panels.



**Fig. 14—Low Beam Adjustment Pattern**

## SEALED BEAM REPLACEMENT

The lens, filament and reflector are sealed into one unit which can be removed as follows:

- (1) Remove screws from headlight bezel and remove bezel (D-500-800, W-600-700 and S-6).
- (2) Remove screws from interior retaining ring, and remove ring. **Do not disturb headlight aimer screws.**
- (3) Pull out sealed beam unit and unplug connector, pulling straight off.
- (4) Install new sealed beam unit.
- (5) Install unit retaining ring.
- (6) Aim the headlight.
- (7) Install headlight bezel (D-500-800, W600-700 and S-6).

## VISUAL HEADLIGHT ADJUSTMENT

### Visual Headlight Adjustment

Place vehicle on a known level floor 25 feet from

aiming screen or other light colored area. Prepare aiming screen as follows:

- (1) Position a vertical tape so that it is aligned with the vehicle centerline.
- (2) Position a horizontal tape with reference to centerline of headlamp.
- (3) Position a vertical tape on the screen with reference to the centerline of each headlamp.

A two headlamp system will have two vertical tapes plus the vehicle centerline tape.

### Adjustment Procedure

Adjust top adjusting screw for vertical adjustment, adjust side screw for horizontal adjustment.

(1) A properly aimed **lower** beam of 5-3/4 inch and 7 inch (type 2) sealed beam (marked "2" on lens) will appear on the aiming screen 25 feet in front of the vehicle. The shaded area as shown in Figure 14 indicates high intensity zone.

(2) Adjust low beam of headlamps to match the low beam patterns of the right and left headlamps.

**NOTE: Type 2 sealed beam should be aimed according to low beam procedure only.**

## TURN SIGNALS AND HAZARD WARNING FLASHER

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## GENERAL INFORMATION

### Turn Signals

The turn signals are actuated with a lever on the left side of the steering column just below the steering wheel. When the driver wishes to signal his intentions to change direction of travel, he moves the lever upward to cause the right signals to flash and downward to cause the left signals to flash.

After completion of a turn the system is deactivated automatically. As the steering wheel returns to the straight ahead position, a canceling cam mounted to the underside of the steering wheel comes in contact with one of two canceling fingers of the turn signal switch mounted in the steering column upper bearing. The cam pushing on the switch canceling finger returns the switch to the off position.

If only momentary signaling such as indication of a lane change is desired, the switch is actuated to a left or right intermediate detent position. In this position the signal lights flash as described above, but the switch returns to the off position as soon as the lever is released.

When the system is activated, one of two indicator

lights mounted in the instrument cluster or on the front fender flashes in unison with the turn signal lights, indicating to the driver that the system is operating.

### Hazard Warning

The hazard warning system is actuated by a switch knob on the right side of the steering column just below the steering wheel. The knob is pulled out (away from the column) to operate the hazard warning system. When the switch is actuated all turn signal lights and turn signal indicators flash simultaneously.

When the hazard warning switch is actuated, the turn signal switch should be in the off position to avoid a characteristic feed back through the accessory circuit which might cause intermittent operation of any accessories left with switches turned on.

### Service Diagnosis Notes

(1) Since the turn signal switch and hazard warning switch are part of the same assembly, they must be replaced as a unit.

## 8-104 ELECTRICAL—TURN SIGNALS AND HAZARD WARNING FLASHER

(2) Since the turn signal switch and hazard warning switch operate the same lamps, and therefore, have much common wiring, analyzing both systems when there is a fault can often lead to more rapid identification of the fault.

(3) The turn signal flasher and the hazard warning flasher are two separate plug-in type units located in the fuse box.

(4) Since the stop lamp circuitry feeds through both the turn signal switch and the hazard warning switch, these switches should be given consideration when there is a failure in the stop lamp circuit.

### TURN SIGNAL/HAZARD WARNING SWITCH

#### Removal

- (1) Disconnect fusible link in engine compartment.
- (2) Remove horn switch. Refer to Horn Section of this Group.
- (3) Remove steering wheel. Refer to Group 19, Steering Column Section.
- (4) Remove turn signal lever mounting nut.
- (5) Remove lever. **CAUTION:** On models equipped

with cruise control **DO NOT REMOVE LEVER, LET HANG LOOSE.**

(6) Remove turn signal/hazard warning switch and upper bearing retainer mounting screws.

(7) Remove retainer.

(8) Remove column cover.

(9) Disconnect light blue wiring harness connector.

(10) Pull switch outwards from steering column, straighten wires, and carefully guide wires through column.

(11) Maneuver connector through column opening and remove switch assembly.

#### Installation

(1) Maneuver connector through column opening, carefully guide wires through and position switch into place.

(2) Connect harness connector.

(3) Install column cover.

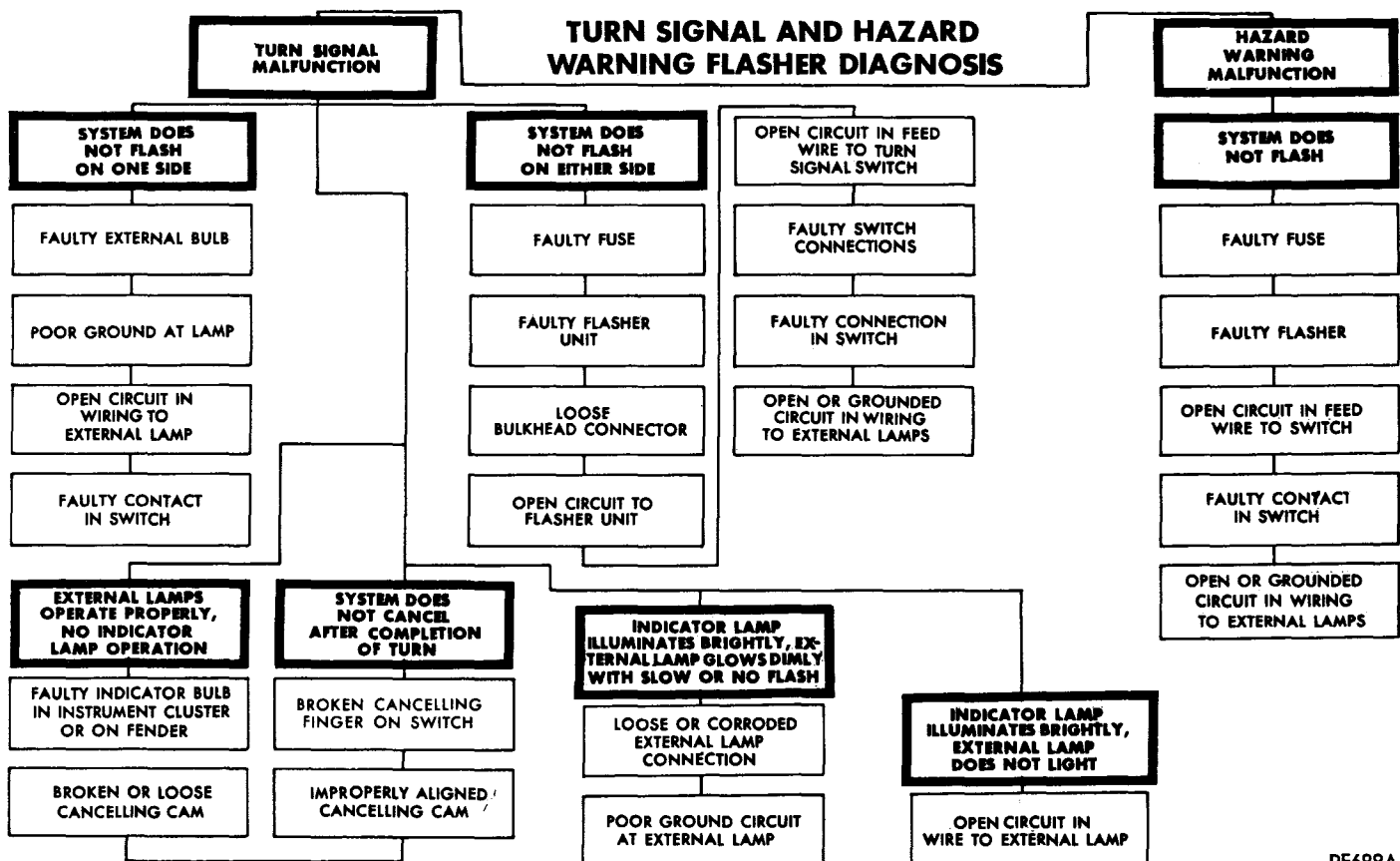
(4) Position upper bearing retainer on switch, install mounting screws and tighten.

(5) Install turn signal lever.

(6) Install steering wheel.

(7) Install horn switch.

(8) Connect fusible link.



## HORNS

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### GENERAL INFORMATION

The horn circuit consists of a horn switch, horns, and all their wiring and connections. The circuit is fed from the fuse box and grounded in the horn switch. When the horn switch on the steering column is pressed, the ground circuit is completed, causing current to flow in the horns.

### TESTING

#### Ground Circuit

Connect one end of a jumper wire to a good ground and touch other end to negative terminal on horn. If horn operates, wire from horn switch is open or horn switch is malfunctioning.

#### Supply Circuit

Connect a jumper between battery positive post and positive terminal on horn. Depress horn switch button. If horn operates wire from fuse box to horn is open or shorted.

#### Horn

If horn does not operate in either the ground or

supply circuit test, horn itself is malfunctioning or improperly adjusted.

### ADJUSTING

(1) Disconnect wires at each horn, one at the time, to determine which horn is not operating.

(2) Connect test ammeter between the horn terminal and horn feed wire.

(3) Have your helper depress the horn switch while you turn the adjusting screw (Fig. 1) until the ammeter reads between 4 and 6 amps.

**NOTE:** Disconnect the horn which operates properly before adjusting horn under test.

**WARNING:** Adjustment will only clear up the sound; it cannot change the horn frequency.

### HORN SWITCH

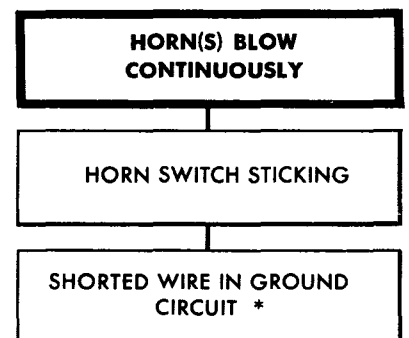
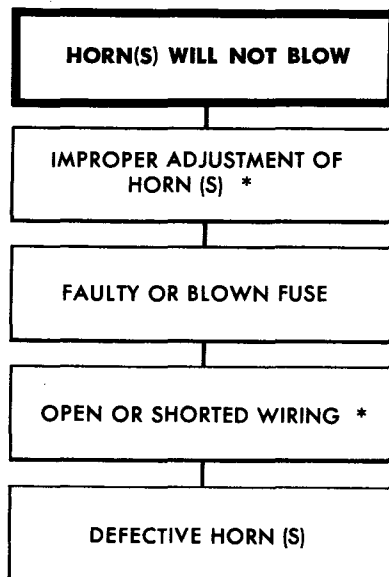
D100-200-300

W100-200-300

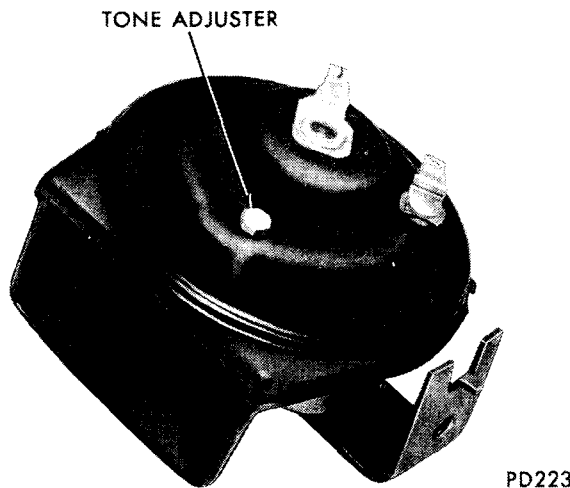
#### Removal (Refer to Figure 2)

(1) Remove horn button from retainer by rotating

### HORN DIAGNOSIS



\* ADJUSTING AND TESTING PROCEDURES ARE DESCRIBED IN APPROPRIATE SECTION OF SERVICE MANUAL



**Fig. 1—Horn Adjustment**

it to the left, or remove horn pad from retainer by removing two screws from underneath.

(2) Pull horn wire from horn switch terminal.

(3) Remove three screws and lift out horn switch and button or pad retainer assembly.

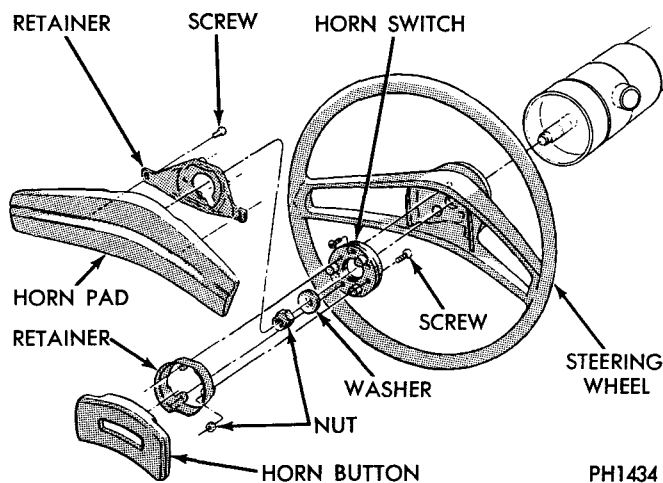
(4) Remove horn switch from retainer by removing the three retainer screws.

#### Installation

(1) Position horn switch to retainer, install three retaining screws and tighten securely.

(2) Install horn switch and retainer assembly into steering wheel, install three retaining screws, and tighten securely.

**Caution:** While inserting switch into steering wheel, care should be taken not to pinch horn wire. Make



**Fig. 2—Horn Switch D and W100-200-300**

sure wire is positioned through the horn switch.

(3) Connect horn switch wire to horn switch terminal.

(4) Install horn button to retainer by rotating it to the right, or install horn pad to retainer by installing the two retaining screws.

**D500-600-800  
W600-S600**

#### Removal (Refer to Figure 3)

(1) Remove horn button assembly from retainer by pushing down and turning clockwise.

(2) Disconnect wire from terminal.

(3) Remove lock ring from horn button.

(4) Remove plate, horn button seat and spring.

#### Installation

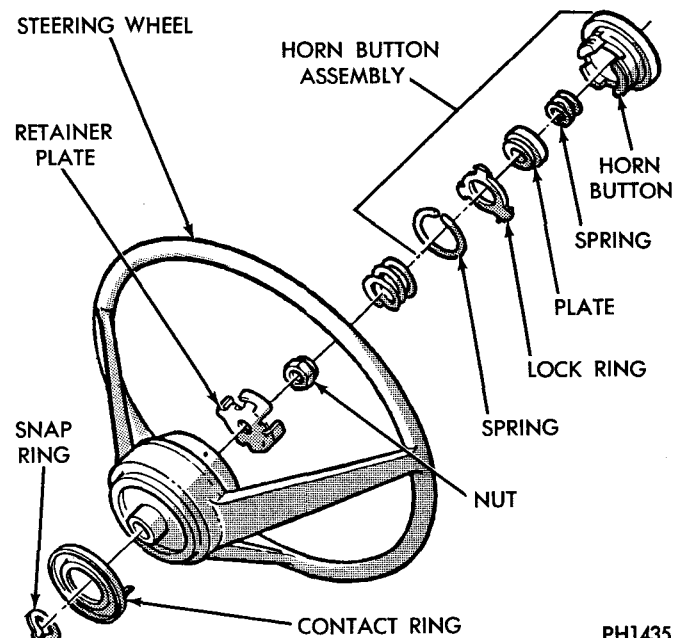
(1) Position spring, seat and plate to horn button.

(2) Squeeze assembly together and install lock ring.

(3) Install wire to terminal.

(4) Install spring and horn button into position on steering wheel, making sure ears on plate are correctly lined up with retainer.

(5) Push horn button down and turn counterclockwise until button locks into place.



**Fig. 3—Horn Switch D500-600-700-800  
W600, S600-700**

## WINDSHIELD WIPERS AND WASHERS

### INDEX

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### GENERAL INFORMATION

The windshield wipers can be operated with the windshield wiper switch only when the ignition switch is in the **Accessory** or **Ignition** position. A circuit breaker, integral with the wiper switch protects the circuitry of the wiper system and the vehicle.

This two speed wiper motor has permanent magnet fields and are controlled by feeding power to different brushes for low and high speed. For low speed operation the current first flows through the torque limiting resistor and then to the low speed brush. For high speed, current is fed directly to the high speed brush.

The wiper system completes the wipe cycle when the switch is turned "Off". The blades park in the lowest portion of the wipe pattern.

### WIPER BLADES

Wiper blades exposed to the weather for a long period tend to lose their wiping effectiveness. If cleaning the windshield and wiping blade edge with a nonabrasive powder type cleaner, does not produce a good wipe, the wiper blades should be replaced.

#### Wiping Element Change

- (1) Turn wiper switch "On", position blades to a convenient place by turning the ignition switch "On" and "Off".
- (2) Lift wiper arm to raise blade off of glass.
- (3) Depress release lever on center bridge and remove blade from arm.
- (4) Depress release button on end bridge to release from center bridge.
- (5) Withdraw rubber wiping element from the end bridges.
- (6) When replacing rubber wiping element use care to insure that all four of the bridge claws are engaged and properly positioned on filler assembly.
- (7) Check each release point for positive locking when installing blade and blade assembly.

### WIPER ARMS

#### Removal

- (1) Position tool C-3982 on wiper arm (Fig. 1), pull together wiper arm and tool and lift from pivot.

### Installation

For proper installation of wiper arm refer to "Adjustment Procedures".

#### Adjustment Procedure

With wiper motor in park position, mount arms on pivot shafts, choosing a serration engagement which locates blades so that distance between heel of blade and lower windshield weather strip is a minimum of 2.75 inch on left (driver's) side and 1.50 inch on right side, (Fig. 2).

### WIPER MOTOR

#### Removal

- (1) Disconnect negative battery cable at negative post.
- (2) Disconnect wires from wiper motor.
- (3) Remove motor mounting screws.
- (4) Lower motor down far enough to gain access to crank arm to drive link retainer bushing.
- (5) Remove crank arm from drive link by prying retainer bushing from crank arm pin with a suitable size screwdriver.
- (6) Remove motor.
- (7) Remove nut attaching crank arm to motor drive shaft.
- (8) Remove crank arm.

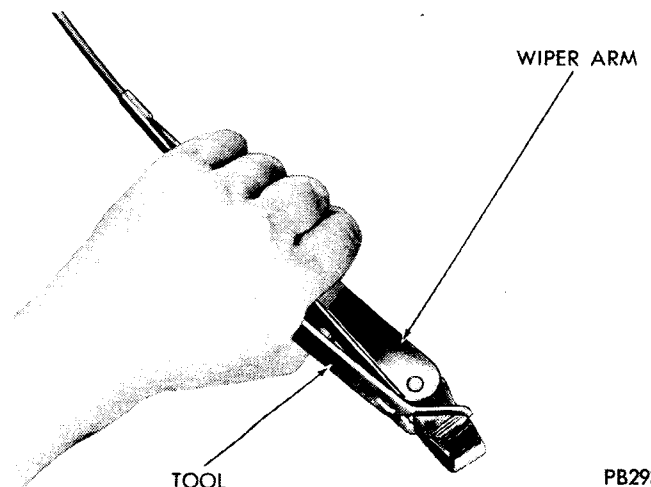
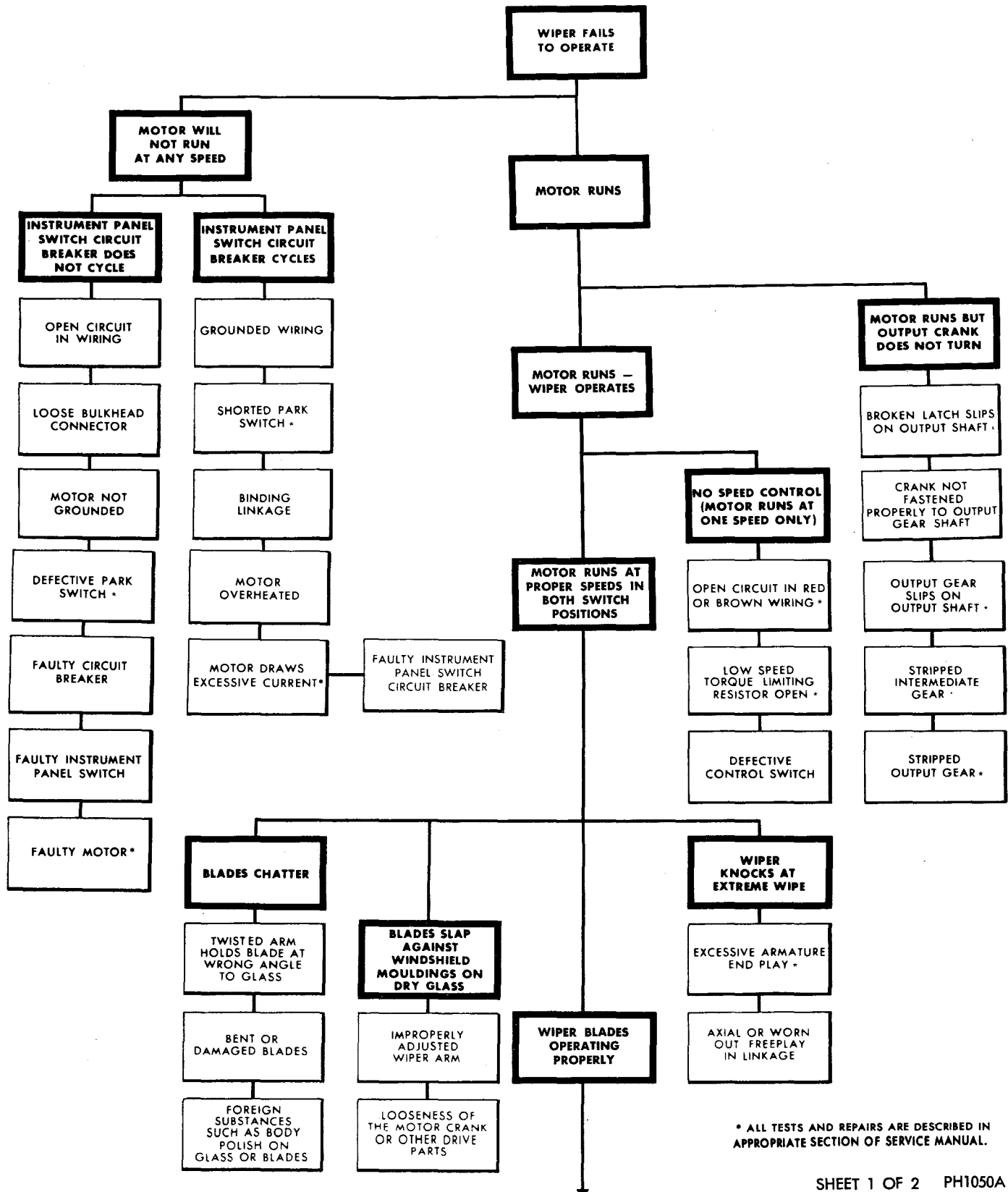
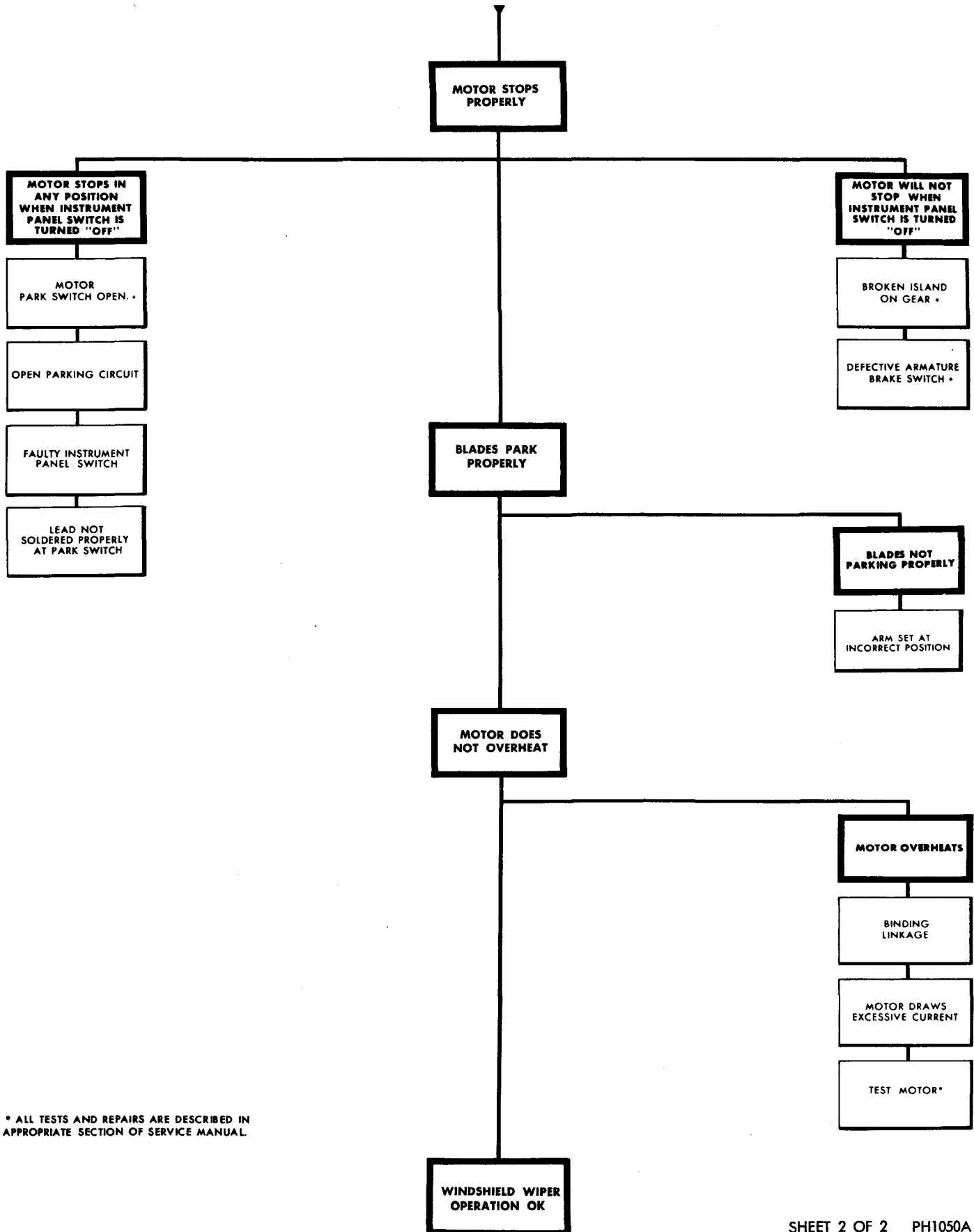


Fig. 1—Removing Wiper Arm

# WINDSHIELD WIPER DIAGNOSIS

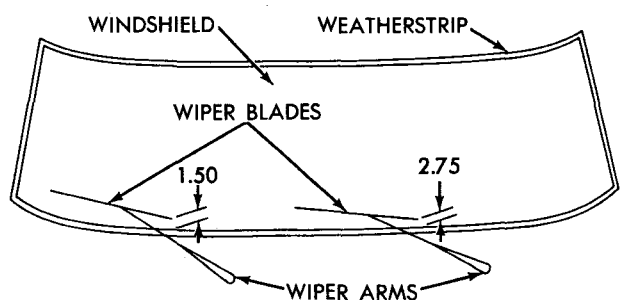


\* ALL TESTS AND REPAIRS ARE DESCRIBED IN APPROPRIATE SECTION OF SERVICE MANUAL.



\* ALL TESTS AND REPAIRS ARE DESCRIBED IN APPROPRIATE SECTION OF SERVICE MANUAL





ADJUST WIPER ARM SO HEEL OF BLADE IS ABOVE THE WEATHERSTRIP IN PARK POSITION AS SHOWN  $\pm .25$  PY1200A

**Fig. 2—Adjusting Wiper Arms**

### Installation

- (1) Position crank arm on motor drive shaft, making sure slot is indexed properly, install mounting nut and tighten to 95 inch pounds torque.
- (2) Install crank arm pin in drive link retainer bushing by snapping together with channel lock pliers.
- (3) Position motor into place, install mounting screws, and tighten to 75 inch pounds torque.
- (4) Connect wires to wiper motor.
- (5) Connect battery cable.

### LINKAGE (Fig. 3)

#### Crank Arm

##### Removal

- (1) Remove wiper motor.
- (2) Remove nut attaching crank arm to motor drive shaft.
- (3) Remove crank arm.

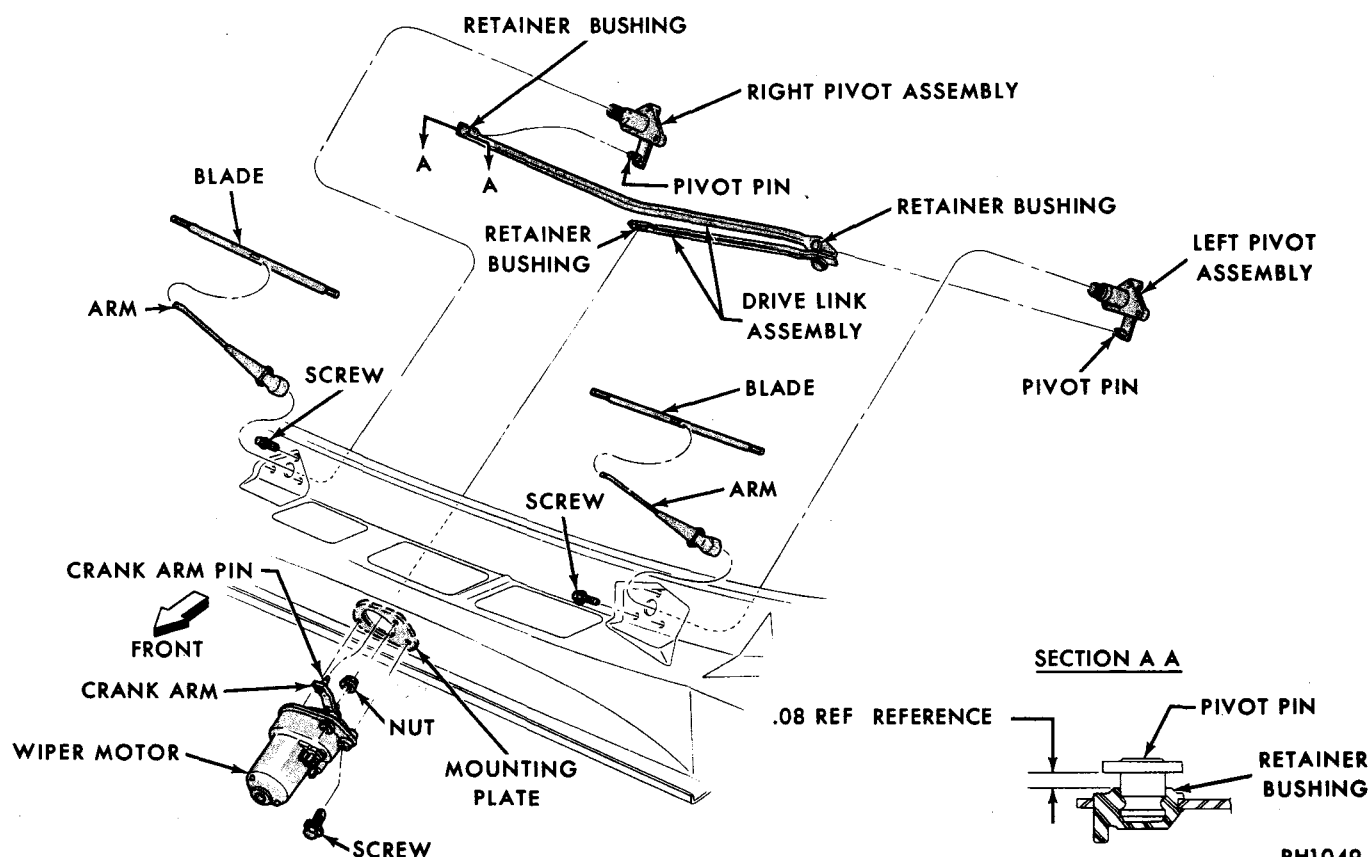
##### Installation

- (1) Position crank arm on motor drive shaft, making sure slot is indexed properly, install mounting nut and tighten to 95 inch pounds torque.
- (2) Install wiper motor.

#### Drive Link Assembly Left Pivot Assembly

##### Removal

- (1) Remove wiper arms.
- (2) Remove screws attaching louvered cowl cover to firewall.
- (3) Remove cowl cover by pulling forward with a slight upward movement.
- (4) Reach through access hole and remove drive link from right pivot by prying retainer bushing from pivot pin with a suitable size screwdriver.



**Fig. 3—Wiper Linkage**

(5) Remove crank arm from drive link by prying retainer bushing from crank arm pin with a suitable size screwdriver.

(6) Remove left pivot mounting screws and let pivot hang loose.

(7) Working through access holes remove drive links and left pivot as an assembly.

(8) Remove drive link from left pivot by prying retainer bushing from pivot pin with a suitable size screwdriver.

(9) Remove retainer bushings from drive link assembly.

### **Installation**

(1) Install retainer bushings in drive link assembly.

(2) Install left pivot pin in drive link retainer bushing by snapping together with channel lock pliers.

(3) Maneuver drive links and pivot assembly through access hole and position into place.

(4) Position left pivot into place, install mounting screws and tighten to 95 inch pounds torque.

(5) Install crank arm pin in drive link retainer bushing by snapping together with channel lock pliers.

(6) Install right pivot pin in drive link retainer bushing by snapping together with channel lock pliers.

(7) Position cowl cover into place, install mounting screws and tighten securely.

(8) Install wiper arms, refer to wiper arm adjustment procedure.

### **Right Pivot Assembly**

#### **Removal**

(1) Remove wiper arms.

(2) Remove screws attaching louvered cowl cover to firewall.

(3) Remove cowl cover by pulling forward with a slight upward movement.

(4) Reach through access hole and remove drive link from right pivot by prying retainer bushing from pivot pin with a suitable size screwdriver.

(5) Remove right pivot mounting screws.

(6) Remove pivot through access hole.

#### **Installation**

(1) Position pivot into place, install mounting screws, and tighten to 95 inch pounds torque.

(2) Install right pivot pin in drive link retainer bushing by snapping together with channel lock pliers.

(3) Position cowl cover into place, install mounting screws and tighten securely.

(4) Install wiper arms.

## **SERVICE PARTS PACKAGE - WIPER MOTOR**

- 
1. Motor Mounting Grommets, Spacers, Mounting Seal and Output Seal Package
  2. Motor Housing Assembly Package
- 

- 
1. Gear Box Assembly Package
  2. Armature Package
- 

## **WINDSHIELD WIPER MOTOR**

### **SERVICE PROCEDURES**

#### **WINDSHIELD WIPER MOTOR SYSTEM TEST**

The following is a list of general wiper motor system problems, the tests that are to be performed to locate the faulty part, and the corrective action to be taken. Refer to proper section of service manual, if problem is diagnosed at the instrument panel switch or wiring.

#### **Condition**

#### **MOTOR WILL NOT RUN IN ANY SWITCH POSITION**

#### **Procedure**

(1) Place panel switch in low speed position.

(2) Listen to motor. If you cannot hear it running, proceed to Step No. 3. If you can hear it running, check motor output shaft. If output shaft is not turn-

ing, replace gearbox assembly. If it is turning, drive link to output shaft or linkage is not connected properly. Replace worn parts and reconnect.

(3) Connect a voltmeter or a test lamp between motor Terminal L and ground (See Fig. 4). If there is approximately 12 volts at Terminal L or test lamp lights and panel switch circuit breaker is not cycling, problem is:

(a) An open ground circuit. Make sure the ground strap is making good contact. (See Fig. 4). If motor runs, panel switch is not grounded, panel switch is faulty or there is an open in wiring.

(b) Common brush is not making a good contact with commutator. Remove motor housing and free-up or reposition spring on common brush. Refer to motor repair section for disassembly and reassembly procedures.

(c) Armature has an open circuit. Remove motor

housing and replace armature. Refer to motor repair section for motor disassembly and reassembly procedures.

(4) If circuit breaker is cycling so that 12 volts are observed or test lamp lights at Terminal L only part of time, problem is:

(a) There is a short in wiring, motor, or panel switch, or circuit breaker is faulty. Disconnect wiring harness connector at motor. Remove wiper arms and blades. Connect an ammeter between battery and Terminal L on motor. If motor now runs and average ammeter reading is less than 6 amps., motor is okay and problem is in panel switch or wiring.

If motor does not run or it runs and draws more than 6 amps, check to see if wiper linkage or pivots are binding or caught. Disconnect drive link from motor. Reconnect jumper wire. If motor now runs and draws less than 3 amps., repair linkage system.

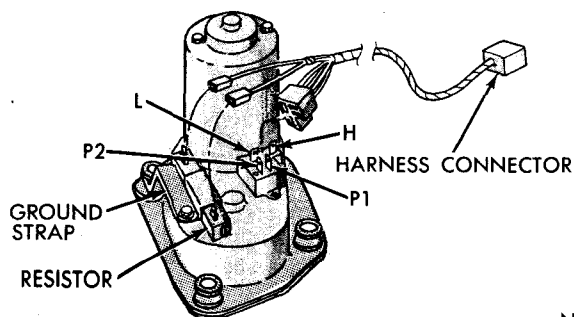
If motor does not run or it draws more than 3 amps., check to see if motor or gearbox are jammed internally. Remove motor housing and inspect for loose magnets or magnet retainer against armature, frozen or loose bearings, or a loose bearing retainer. With linkage disconnected, turn armature in gearbox to determine if gears are jammed. Replace faulty gearbox or housing. Also, replace armature if blackened. Refer to motor repair section for disassembly and reassembly procedures.

(c) If motor is not jammed internally, check to see if there is a short in motor. Remove motor housing. Check brush leads for signs of shorts to housing. Check armature for burned or blackened windings which could mean internal shorts. Replace armature, if it is burned. Refer to motor repair section for motor disassembly and re-assembly procedure.

(5) If after several minutes no voltage has appeared or test lamp has not turned on at Terminal L to indicate a cycling circuit breaker, disconnect wiring harness and connect a jumper from battery to Terminal L. If motor now runs, wiring or panel switch is faulty.

#### Condition

**MOTOR WILL RUN AT LOW SPEED, BUT NOT AT HIGH SPEED.**



**Fig. 4—Wiper Motor Terminal Identification**

#### Procedure

(1) If motor will not run on high speed, put panel switch in high position and connect a test lamp between motor Terminal H and ground (See Fig. 4).

(2) If test lamp does not light at motor terminal, there is an open in wiring or switch. If test lamp lights at motor terminal, brush is not making contact with armature. Remove motor housing and free-up brush or seat brush spring properly (See motor repair section).

#### Condition

**MOTOR WILL RUN AT HIGH SPEED BUT NOT AT LOW SPEED.**

#### Procedure

(1) If motor will not run at low speed, put panel switch in low position and connect a test lamp between motor terminal L and ground (See Fig. 4).

(2) If test lamp does not light at motor terminal, there is an open in wiring, switch, or resistor. To check the resistor, move test lamp from L terminal on motor to terminal on resistor that has the brown with yellow tracer wire. If test lamp lights, replace resistor.

(3) If test lamp lights at motor terminal, low speed brush is not making proper contact with armature. Remove motor housing and free up brush or seat brush properly. (See motor repair section.)

#### Condition

**MOTOR WILL KEEP RUNNING WITH PANEL SWITCH IN PARK OR OFF POSITION.**

#### Procedure

Remove wiring harness. Connect jumper from Terminal P<sub>2</sub> to Terminal L (See Fig. 4).

Connect second jumper from Terminal P<sub>1</sub> to battery. If motor runs to park position and stops, panel switch is faulty. If motor keeps running and does not park, replace gearbox assembly. Refer to motor repair section for disassembly and re-assembly procedures.

#### Condition

**MOTOR WILL STOP WHEREVER IT IS AT WHEN PANEL SWITCH IS PUT IN OFF POSITION. (WIPERS DO NOT CONTINUE RUNNING TO PARK POSITION.)**

#### Procedure

(1) Remove motor wiring connector and clean terminals. Reconnect connector and test motor. If problem persists, proceed to Step No. 2.

(2) Put panel switch in park position.

(3) Connect a voltmeter or test lamp between Terminal P<sub>1</sub>, and ground check the voltage at Terminal P<sub>2</sub> is 0 or test lamp does not come on at Terminal P<sub>1</sub>, there is a panel switch or wiring problem.

If there is 12 volts or test lamp lights at Terminal P<sub>1</sub>, check the voltage at Terminal P<sub>2</sub>. If voltage at Terminal P<sub>2</sub> is 0 or test lamp does not light motor park switch is faulty and gearbox assembly must be replaced (Refer to motor repair section for motor disassembly and re-assembly procedures). If there is 12 volts at Terminal P<sub>2</sub>, or test lamp comes on, there is an open in the panel switch or the wiring.

### PANEL SWITCH TESTS (Figs. 5 and 6)

To test the switch, disconnect the wiring and remove from the instrument panel. For removal and installation of the wiper switch see "Instrument Panels".

Using a continuity tester or an ohmmeter, test for continuity (no resistance) between the contact terminals of the switch as shown in the following chart. For test purposes, the first position is the "Off" position. The "Low" position is the first detent past the "Off" position. The "High" position is the second detent of the switch. The bench test of the switch does not require the use of a twelve volt battery. "Ground" is the case of the switch.

#### SWITCH CONTINUITY CHART

Off	Low	High
B to B/U.	B to B/U.	B to B/U.
B to P1.	B to P1.	B to P1.
A to P2.	B to A.	B to H.
H-open	P-2 open	P2-open
	H-open	A-open

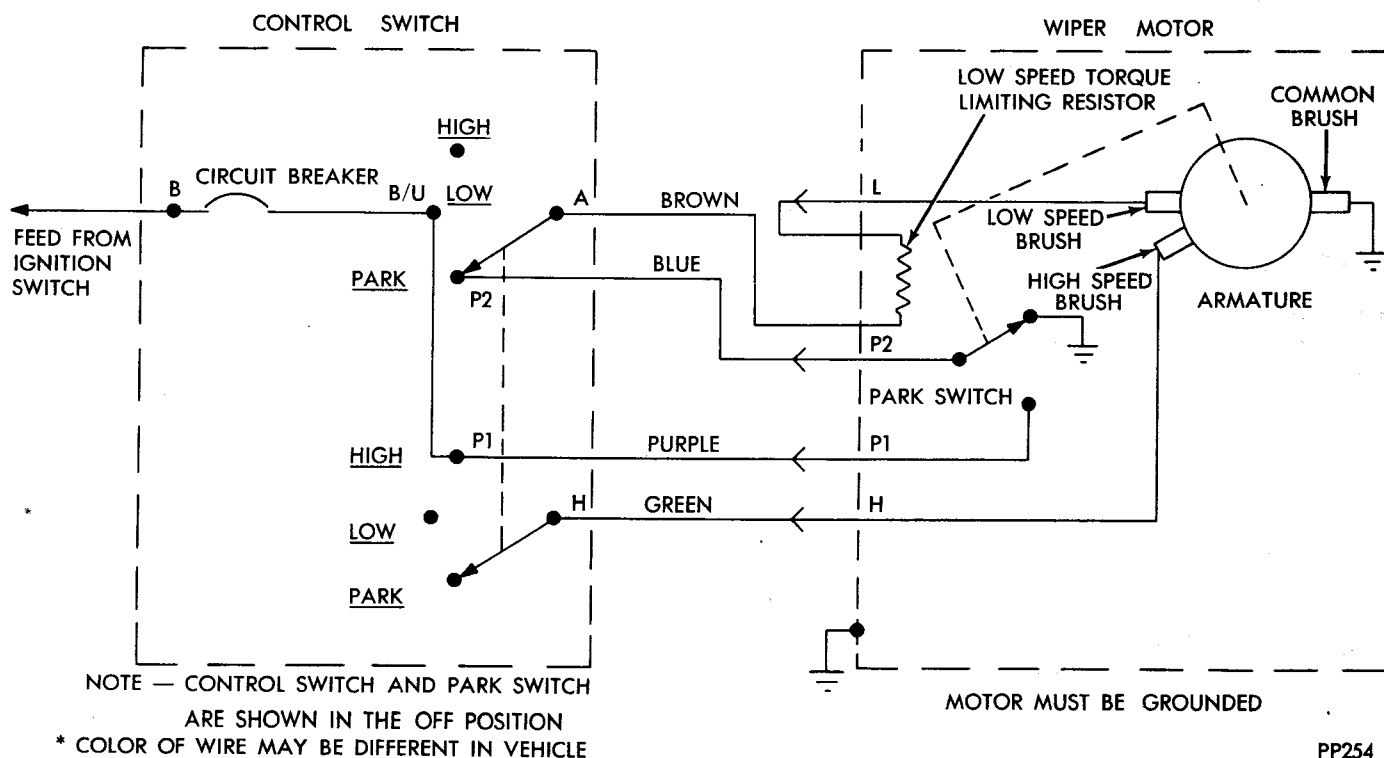


Fig. 5—Wiper Motor Wiring Schematic

### MOTOR REPAIR (Fig. 6)

If the motor is found to be defective after tests, disassemble the motor as follows:

#### Disassembly

- (1) Remove wiper motor.
- (2) Mount motor assembly in a vise.
- (3) Remove motor housing through bolts.
- (4) Remove motor housing and armature assembly.
- (5) Remove flat washers and spring washer.

#### Repair

- (1) Inspect motor housing for following items:

- (a) Foreign material,
  - (b) magnets, retaining clips or bearing retainers are loose or broken,
  - (c) plastic thrust bearing missing or damaged.
- Thrust bearing can be seen by looking through center of bearing in bottom of motor housing.

If any of these conditions exist replace housing.

- (2) Test Armature as follows:

#### Testing Armature for Short Circuit

Place armature in growler and hold a thin steel blade parallel to the core and just above it, while slowly rotating armature in growler. A shorted armature will cause blade to vibrate and be attracted to the core. Replace armature if shorted.

#### Testing Armature for Ground

Contact armature shaft and each of the commutator riser bars with a pair of test lamp probes. If lamp

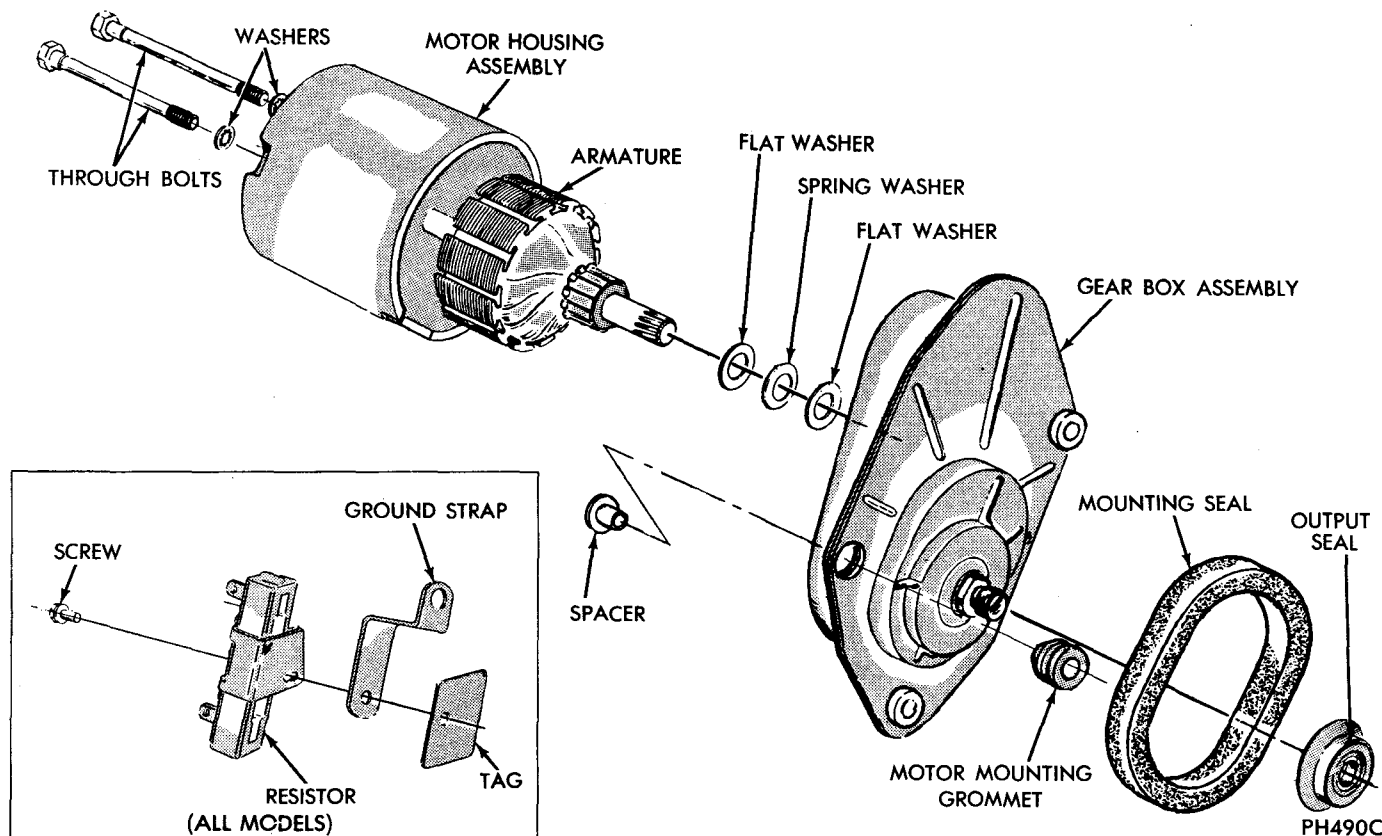


Fig. 6—Wiper Motor (Exploded View)

lights, it indicates a grounded armature. Replace grounded armature.

### Checking for Open Commutator Bars

Contact adjacent commutator riser bars with a pair of test lamp probes. The lamp should light on each bar. If the lamp fails to light the wire to bar junction is open. Replace open armature.

### Inspection of Armature Shaft Gear Teeth

Visually inspect armature shaft gear teeth. Replace both the armature and the gear box if armature gear has nicks or burrs.

(3) Reposition any brush springs not properly assembled behind brushes.

(4) File sides of any brushes that may be stuck in slots.

### Assembly

(1) Lock gear box in bench vise by the flange—brush holder up.

(2) Clean commutator with ink eraser, install a flat washer, spring washer and flat washer on armature shaft. Place armature in brush holder assembly.

(3) Release brush leads from brush holder notches (check to see brushes are spring loaded against the commutator).

(4) Align the window in the motor housing with the brush holder and install it quickly over the armature so the magnets in the motor housing do not pull the armature out of the brush holder. Make sure that the motor housing is flush with the gear housing and over the four detents.

(5) Install motor housing through bolts.

(6) Install resistor assembly and part number tag. Secure with screw (install tag atop resistor bracket with screw head against ground strap).

(7) Bench test wiper motor assembly. Tap the assembly gently with a mallet to align bearings in the motor housing and gear housing during the run period.

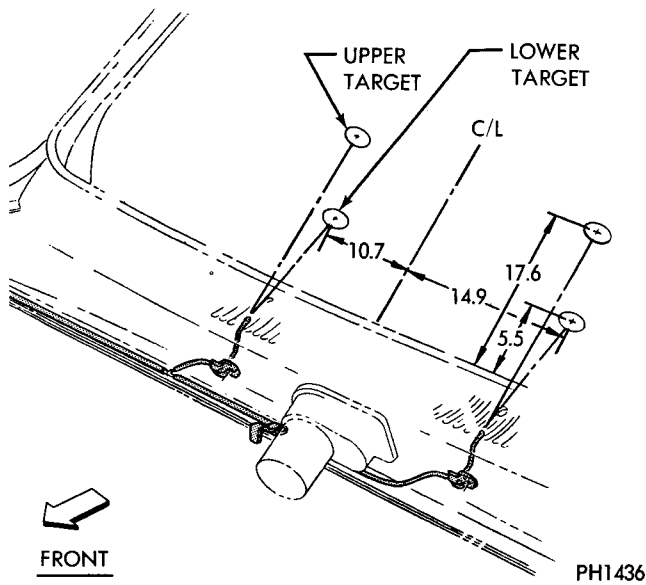
(8) Install bulkhead seal.

## WINDSHIELD WASHERS

### NOZZLE ADJUSTMENT

**CAUTION:** To prevent possible injury do not adjust the nozzles while the wipers are operating.

For lateral adjustment loosen the mounting screw and move the nozzle and bracket assembly until the nozzle is centered between the grille louvers. Vertical nozzle adjustment is made by bending the nozzle



**Fig. 7—Nozzle Adjustment**

mounting bracket up or down by the tab provided.

Adjust nozzles so that the Impact point of the upper stream contacts the windshield glass as shown in Figure 7. The lower stream should impact the glass in the wiper pattern area, when the upper stream is

aimed properly. If not the nozzle is defective and should be replaced.

## WASHER PUMP

### Removal

- (1) Remove liquid from reservoir.
- (2) Disconnect pump ground wire by removing mounting screw.
- (3) Remove reservoir mounting screws and remove reservoir and pump assembly.
- (4) Disconnect electrical lead and rubber hose from bottom of pump.
- (5) Using an extension and deep well socket, reach through reservoir filler neck, and remove pump mounting nut and plastic washer.
- (6) Remove pump from bottom of reservoir.
- (7) Remove rubber grommet from reservoir and throw away.

### Installation

- (1) Install new rubber grommet on reservoir.
- (2) Position pump into place, install plastic washer, mounting nut, and tighten securely.
- (3) Connect electrical lead and rubber hose to pump.
- (4) Connect ground wire.
- (5) Fill reservoir.

## SPECIFICATIONS

### BATTERY

Ampere Hours	Cranking Rating @ 0° F.	Reserve Capacity	Application
48	305 amps	68 minutes	Standard
59	375 amps	86 minutes	Optional or standard with special equipment
70	440 amps	102 minutes	Optional or standard with special equipment
90	385 amps	147 minutes	Optional or standard with special equipment

CRANKING RATING is the current a battery can deliver for 30 seconds and maintain a terminal voltage of 7.2 volts or greater at a specified temperature.

RESERVE CAPACITY RATING is the amount of time a battery can deliver 25 amperes and maintain a minimum terminal voltage of 10.5 volts at 80° F.

### DIRECT DRIVE STARTER MOTOR

Part Number .....	2642692
Make Model .....	Chrysler Built
Voltage .....	12
No. of Fields .....	4 (3 Series 1 Shunt)
No. of Poles .....	4
Brushes .....	4
Spring Tension .....	32 to 36 Ounces
Drive .....	Solenoid Shift
End Play .....	Overrunning Clutch
Cranking Amperage Draw Test .....	.005" Minimum

## 8-116 SPECIFICATIONS

Free-Running Test	180 to 220 Amps.*
Voltage .....	11
Amperage Draw .....	78 Amps. Maximum
Minimum Speed RPM .....	3800 RPM
Locked-Resistance Test	
Voltage .....	4
Amperage Draw .....	310 to 445
Solenoid	
Pull-In Coil .....	20.0 to 22.2 Amperes @ 6.0 Volts
Hold-In Coil .....	11.2 to 12.4 Amperes @ 6.0 Volts
Pinion to Housing Clearance .....	1/8" plus or minus
	1/32" Between Pinion Stop and end of Pinion

\* Engine should be up to operating temperature. Extremely heavy oil or tight engine will increase starter amperage draw.

### REDUCTION GEAR STARTER MOTOR

Starting Motor Model .....	3755900
Make .....	Chrysler Built
Voltage .....	12
Number of Fields .....	4 Series Parallel
Number of Poles .....	4
Brushes .....	4
Spring Tension .....	32 to 36 Ounces
Drive .....	Solenoid Shift Overrunning Clutch
End Play .....	.010"—.045"
*Cranking Amperage Draw .....	165 to 180 Amps. 225, 318 Cu. In. Engines
	180 to 200 Amps. 360, 440 Cu. In. Engines
Free-Running Test	
Voltage .....	11
Amperage Draw .....	90
Minimum Speed RPM .....	3700
Locked Resistance Test	
Voltage .....	4
Amperage Draw .....	475 to 550
Solenoid Switch	
Pull-In Coil .....	13 to 15 Amps. @ 6 Volts @ 77°F.
Hold-In Coil .....	8 to 9 Amps. @ 6 Volts @ 77°F.

\*Engine should be at operating temperature.

### ALTERNATOR

#### Identification

Red Tag .....	41 Amp.
Blue Tag .....	60 Amp.
Natural Tag .....	60 Amp.
Yellow Tag .....	100 Amp.
Rotation .....	Clockwise at Drive End
Voltage .....	12 Volt System
Current Output .....	Design Controlled
Voltage Output .....	Limited by Voltage Regulator
Brushes (Field) .....	2
Condenser Capacity .....	0.5 Microfared plus or minus 20%
Field Current Draw	
Rotating by Hand .....	4.5 to 6.5 Amperes @ 12V All
	Except 100 Amp. 4.75
	to 6.0 @ 12V
Current Rating	
41 Amp. ....	Current Output
60 Amp. ....	40 Amp. Minimum
100 Amp. ....	57 Amp. Minimum
	72 Amp. Minimum

Current output is measured at 1250 engine rpm and 15 volts at the alternator, 900 rpm and 13 volts for 100 Amp alternator. If measured at the battery, current output will be approximately 5 amperes lower than above value.

Voltage is controlled by variable load (carbon pile) across the battery.

## ELECTRONIC VOLTAGE REGULATOR

Part Number ..... 3755960

The battery specific gravity should be above 1.200 when checking the regulated voltage.  
The voltage regulator is working properly if the voltage is in accordance with the following chart:—

Ambient Temperature 1/4" From Voltage Regulator	Voltage Range
—20°F.	14.9 to 15.9
80°F.	13.9 to 14.6
140°F.	13.3 to 13.9
Above 140°F.	Less than 13.9

## DISTRIBUTOR APPLICATION

Listed by part number as stamped on distributor identification tag.

C.I.D.	Carburetor	Transmission	Federal	California	Canada
225 L.D.	1-bbl.	M-A	3874598*	3874598*	3874598***
225-1 H.D.	2-bbl.	M-A	3755056	N.A.	3755056
318 L.D.	2-bbl.	M-A	3874090*	3874090*	3874090*
318-1 H.D.	2-bbl.	M-A	3755201*	4091282*	3755201*
318-3 H.D.	2-bbl.	M-A	3656667	N.A.	3656667
360 L.D.	2-bbl.	A	3874115	N.A.	3874115
360-1 H.D.	2-bbl.	M-A	3656672	3755201**	3656672
360-3 H.D.	2-bbl.	M-A	3874672	3874672**	3874672
361-4 H.D.	2-bbl.	M-A	3755520 Holley#	N.A.	3755520 Holley*
361-4 H.D.	2-bbl.	A	3656830	N.A.	3656830
400 L.D.	2-bbl.	M-A	N.A.	N.A.	3874101
400-1 H.D.	2-bbl.	M-A	3755150	3755150	3755150
413-3 H.D.	4-bbl.	M-A	3656872 Holley	N.A.	3656872 Holley
440-1 H.D.	4-bbl.	M-A	3755157	3755157	3755157

L.D.—Light Duty Cycle  
H.D.—Heavy Duty Cycle  
M—Manual

A—Automatic  
N.A.—Not Available  
\*With Catalyst

\*\*With Air Pump  
\*\*\*Without Catalyst D-100 with Automatic Transmission  
#Used with Chrysler A-345 Transmission

## DISTRIBUTOR SPECIFICATIONS

Listed By Part Number In Numerical Order

PART NUMBER	3656667	3656672	3656830
Rotation .....	Clockwise	Clockwise	Counterclockwise
Firing Order .....	1-8-4-3-6-5-7-2	1-8-4-3-6-5-7-2	1-8-4-3-6-5-7-2
Advance Centrifugal .....	0.5° to 3.5° @ 550	0.5° to 3.5° @ 550	1.0° to 5.0° @ 550
(Distributor Degrees	7.0° to 9.0° @ 900	5.0° to 7.5° @ 800	8.0° to 10.5° @ 800
at Distributor RPM)	13.5° to 16.0° @ 2200	11.5° to 14.0° @ 2200	14.0° to 16.0° @ 1600
Advance Vacuum .....	1.0° to 3.5° @ 9.5"	0.5° to 2.5° @ 10"	1.0° to 4.0° @ 9.5"
(Distributor Degrees	7.0° to 10.0° @ 14"	7.5° to 9.5° @ 15"	6.5° to 9.5° @ 13.5"
at Inches of Mercury)			
Shaft Side Play*	Not To Exceed .006"	Not To Exceed .006"	Not To Exceed .006"
Shaft End Play .....	.003" to .017"	.003" to .017"	.003" to .017"

\*Refer to "Shaft and Bushing Wear Test"



# 8-118 SPECIFICATIONS

PART NUMBER	3656872	3755056	3755150
Rotation .....	Counterclockwise	Clockwise	Counterclockwise
Firing Order .....	1-8-4-3-6-5-7-2	1-5-3-6-2-4	1-8-4-3-6-5-7-2
Advance Centrifugal .....	1.0° to 4.5° @ 550	1.0° to 4.5° @ 550	1.0° to 4.5° @ 650
(Distributor Degrees	5.5° to 8.0° @ 750	4.5° to 7.9° @ 700	8.0° to 10.5° @ 950
at Distributor RPM)	11.5° to 14.0° @ 2000	11.5° to 14.0° @ 2200	11.5° to 14.0° @ 2000
Advance Vacuum .....	1.0° to 4.0° @ 9.5"	1.5° to 11.0° @ 11"	1.0° to 4.0° @ 10.5"
(Distributor Degrees	6.5° to 9.5° @ 13.5"	5.0° to 8.0° @ 12.5"	8.0° to 10.5° @ 15.5"
at Inches of Mercury)			
Shaft Side Play* .....	Not To Exceed .006"	Not To Exceed .006"	Not To Exceed .006"
Shaft End Play .....	.003" to .017"	.003" to .017"	.003" to .017"

\*Refer to "Shaft and Bushing Wear Test"

PART NUMBER	3755157	3755201	3755520
Rotation .....	Counterclockwise	Clockwise	Counterclockwise
Firing Order .....	1-8-4-3-6-5-7-2	1-8-4-3-6-5-7-2	1-8-4-3-6-5-7-2
Advance Centrifugal .....	0.5° to 3.5° @ 650	0.5° to 3.0° @ 550	1.0° to 5.0° @ 550
(Distributor Degrees	5.5° to 8.0° @ 900	2.5° to 5.0° @ 700	8.0° to 10.5° @ 800
at Distributor RPM)	9.5° to 12.0° @ 2000	11.5° to 14.0° @ 2150	14.0° to 16.0° @ 1600
Advance Vacuum .....	1.0° to 4.0° @ 10.5"	0.5° to 2.5° @ 10"	1.0° to 4.0° @ 9.5"
(Distributor Degrees	8.0° to 10.5° @ 15.5"	7.5° to 9.5° @ 15"	6.5° to 9.5° @ 13.5"
at Inches of Mercury)			
Shaft Side Play* .....	Not To Exceed .006"	Not To Exceed .006"	Not To Exceed .006"
Shaft End Play .....	.003" to .017"	.003" to .017"	.003" to .017"

\*Refer to "Shaft and Bushing Wear Test"

PART NUMBER	3874090	3874101	3874115
Rotation .....	Clockwise	Counterclockwise	Clockwise
Firing Order .....	1-8-4-3-6-5-7-2	1-8-4-3-6-5-7-2	1-8-4-3-6-5-7-2
Advance Centrifugal .....	1.5° to 5.5° @ 550	0.5° to 3.0° @ 600	1.3° to 3.1° @ 600
(Distributor Degrees	5.5° to 8.0° @ 700	6.0° to 8.5° @ 950	5.8° to 7.5° @ 800
at Distributor RPM)	11.5° to 14.0° @ 2200	10.0° to 12.0° @ 2000	10.0° to 12.0° @ 2000
Advance Vacuum .....	0.5° to 2.5° @ 7"	.05° to 2.5° @ 8"	0.8° to 2.6° @ 7"
(Distributor Degrees	10.0° to 12.0° @ 12.5"	9.0° to 11.0° @ 14"	10.0° to 12.0° @ 12.5"
at Inches of Mercury)			
Shaft Side Play* .....	Not To Exceed .006"	Not To Exceed .006"	Not To Exceed .006"
Shaft End Play .....	.003" to .017"	.003" to .017"	.003" to .017"

\*Refer to "Shaft and Bushing Wear Test"

PART NUMBER	3874598	3874887	4091282
Rotation .....	Clockwise	Counterclockwise	Clockwise
Firing Order .....	1-5-3-6-2-4	1-8-4-3-6-5-7-2	1-8-4-3-6-5-7-2
Advance-Centrifugal (Distributor	1.0° to 4.5° @ 600	1.0° to 3.2° @ 650	0.8° to 4.7° @ 500
Degrees at Distributor RPM) ...	6.5° to 8.5° @ 800	3.8° to 5.9° @ 950	4.3° to 5.8° @ 700
	9.5° to 11.5° @ 2300	9.6° to 12.0° @ 2400	11.5° to 13.5° @ 2400
Advance-Vacuum (Distributor	0.5° to 2.5° @ 7"	1.6° to 3.1° @ 7"	1.4° to 2.5° @ 7"
Degrees at Inches of Mercury) ..	7.0° to 10.0° @ 11.5"	5.3° to 8.0° @ 11.5"	6.0° to 8.0° @ 13.5"
Shaft Side Play* .....	Not To Exceed .006"	Not To Exceed .006"	Not To Exceed .006"
Shaft End Play .....	.003" to .017"	.003" to .017"	.003" to .017"

\*Refer to Shaft and Bushing Wear Test.

## IGNITION SYSTEM

The following specifications are published from the latest information available at the time of publication. If Curb Idle RPM, Ignition Timing, or Carbon Monoxide (CO) percentages differ from those on the Emission Control Information Label, use the specification on the label.

				FEDERAL			CALIFORNIA			CANADA		
				Basic□ Timing	Curb△ Idle Speed RPM	Propane Enriched Idle Speed RPM	Basic□ Timing	Curb△ Idle Speed RPM	Idle Mixture % of CO	Basic□ Timing	Curb△ Idle Speed RPM	Propane Enriched Idle Speed RPM
Engine	Carburetor	Transmission										
225 L.D.	1 BBL	M		2°BTDC	750	900	TDC	750	0.3	2°BTDC†	750	900
225 L.D.	1 BBL	A		2°BTDC	750	850	2°ATDC	750	0.3	2°BTDC†	750	850
225-1 H.D.	2 BBL	M		TDC	700	750				TDC	700	750
225-1 H.D.	2 BBL	A		TDC	700	770				TDC	700	770
318 L.D.	2 BBL	M		2°BTDC	750	850	2°BTDC	750	0.3	2°BTDC	750	850
318 L.D.	2 BBL	A		2°BTDC	750	920	2°BTDC	750	0.3	2°BTDC	750	920
318-1 H.D.	2 BBL	M		2°ATDC	750	800				2°ATDC	750	800
318-1 H.D.	2 BBL	A		2°ATDC	750	820	TDC	700	0.3	2°ATDC	750	820
318-3 H.D.	2 BBL	M		TDC	700	750				TDC	700	750
318-3 H.D.	2 BBL	A		TDC	700	770				TDC	700	770
360 L.D.	2 BBL	A		6°BTDC	700	820				6°BTDC	700	800
360-1 H.D.	2 BBL	M		TDC	750	790				TDC	750	790
360-1 H.D.	2 BBL	A		TDC	750	810	TDC	700	0.1	TDC	750	810
360-3 H.D.	2 BBL	M		TDC	750	790	TDC	700	0.1	TDC	750	790
360-3 H.D.	2 BBL	A		TDC	750	810	TDC	700	0.1	TDC	750	810
361-4 H.D.	2 BBL	M		2.5°BTDC	700	750				2.5°BTDC	700	750
361-4 H.D.	2 BBL	A		2.5°BTDC	700	770				2.5°BTDC	700	770
400 L.D.	2 BBL	A		—	—	—				6°BTDC	700	760
400-1 H.D.	2 BBL	M		2°BTDC	700	740				2°BTDC	700	740
400-1 H.D.	2 BBL	A		2°BTDC	700	760				2°BTDC	700	760
413-3 H.D.	4 BBL	M		5°BTDC#	700	750				5°BTDC#	700	750
413-3 H.D.	4 BBL	A		5°BTDC#	700	770				5°BTDC#	700	770
400-1 H.D.	4 BBL	M		8°BTDC	700	740	8°BTDC	700	0.5	8°BTDC	700	740
440-1 H.D.	4 BBL	A		8°BTDC	700	760	8°BTDC	700	0.5	8°BTDC	700	760
				Federal High Altitude	Below 4000 Feet	Above 4000 Feet	California High Altitude					
318 L.D.	2 BBL	A		6°BTDC*	750	920	6°BTDC*	750	0.3			

M—Manual

A—Automatic

TDC—Top Dead Center

ATDC—After Top Dead Center

BTDC—Before Top Dead Center

□ Basic ignition timing  $\pm 2^\circ$

△ Curb idle speed  $\pm 100$  RPM

† 2° ATDC for D-100 curb idle 750  
Enriched idle 840

LD—Light Duty Cycle

HD—Heavy Duty Cycle

# TDC for school bus

\* 2° BTDC below 4000 feet

## SPARK PLUGS

Engine	Spark Plug*	Size	Gap	Gasket	Torque
225 L.D.	RBL 15Y Tapered Seat	14 mm .460" Reach	.035"	No	10 Ft. Lbs.
225-1 H.D.	RBL 11Y Tapered Seat	14 mm .460" Reach	.035"	No	10 Ft. Lbs.
318 L.D.	RN 11Y	14 mm 3/4" Reach	.035"	Yes	30 Ft. Lbs.
318-1 H.D.	RN 11Y	14 mm 3/4" Reach	.035"	Yes	30 Ft. Lbs.
318-3 H.D.	RF 10 Tapered Seat	18 mm .460" Reach	.035"	No	20 Ft. Lbs.
360 L.D.	RN 12Y	14 mm 3/4" Reach	.035"	Yes	30 Ft. Lbs.
360-1 H.D.	RN 12Y	14 mm 3/4" Reach	.035"	Yes	30 Ft. Lbs.
360-3 H.D.	RF 10 Tapered Seat	18 mm .460" Reach	.035"	No	20 Ft. Lbs.
361-4 H.D.	RN 6	14 mm 3/4" Reach	.035"	Yes	30 Ft. Lbs.
400 L.D.	RJ 11Y	14 mm 3/8" Reach	.035"	Yes	30 Ft. Lbs.
400-1 H.D.	RJ 11Y	14 mm 3/8" Reach	.035"	Yes	30 Ft. Lbs.
413-3 H.D.	RN 6	14 mm 3/4" Reach	.035"	Yes	30 Ft. Lbs.
440-1 H.D.	RJ 11Y	14 mm 3/4" Reach	.035"	Yes	30 Ft. Lbs.

\*Champion or Equivalent

## IGNITION COIL AND BALLAST RESISTOR

<b>Coil</b> .....	Chrysler Prestolite	Chrysler Essex
Identification .....	2444242	2444211
Primary Resistance @ 70—80°F .....	1.60 to 1.79 ohms	1.41 to 1.55 ohms
Secondary Resistance @ 70—80°F .....	9400 to 1170 ohms	8000 to 11200 ohms
<b>Ballast Resistor</b> .....	3656199	
Resistance @ 70—80°F .....		
Compensating (Coil Side) .....	.50-.60 ohms	
Auxiliary (Control Unit Side) .....	4.75-5.75 ohms	

## FUSES

## D and W-100, 200, 300

COMPONENT	FUSE	LOCATION*
Turn Signals, Gauges and Brake Warning	AGC20	Fuse Box
Radio	AGC 7-1/2	Fuse Box
Heater and Air Conditioner	AGC20	Fuse Box
Ignition Accessories	AGC20	Fuse Box
Tachometer		
Air Conditioner Clutch		
Auxiliary Fuel Tank		
Speed Control		
Horn and Back-Up Lamps	AGC20	Fuse Box
Tail, Park, Side-Marker and License Lamp	AGC20	Fuse Box
Battery Accessories	AGC20	Fuse Box
Cigarette Lighter		
Cargo Lamp		
Glove Box Lamp		
Dome and Ignition Lamps	AGC20	Fuse Box
Stop Lamp and Hazard Warning Lamps	AGC20	Fuse Box
Instrument Lamps	AGC4	Fuse Box
Radio Lamp		
Cigarette Lighter Lamp		
Camper Wiring (Hot Feed)	AGC20	In Line—Near Starter Relay

\* Fuse Box Located Under Glove Box Door

### CIRCUIT BREAKERS D and W-100, 200, 300

Circuit	Amp.	Location
Headlights .....	20	Integral with Switch
Windshield Wiper .....	6	Integral with Switch
Trailer Towing or Camper Package .....	15	Fuse Box

### FUSES D-500, 600, 800, W600, S600

COMPONENT	FUSE	LOCATION*
Turn Signals, Gauges	AGC 20	Fuse Box
Radio	AGC 7-1/2	Fuse Box
Heater and Air Conditioner	AGC 20	Fuse Box
Ignition Accessories	AGC 20	Fuse Box
Voltmeter		
Air Conditioner Clutch		
Dual Fuel Tanks		
Horn and Back-Up Lamps	AGC 20	Fuse Box
Tail, Park, Side-Marker and License Lamp	AGC 20	Fuse Box
Battery Accessories	AGC 20	Fuse Box
Cigarette Lighter		
Dome Lamp	AGC 20	Fuse Box
Stop Lamp and Hazard Warning Lamps	AGC 20	Fuse Box
Instrument Lamps	AGC4	Fuse Box
Radio Lamp		
Voltmeter Lamp		
Air or Vacuum Gauge Lamp		

\*Fuse Box located under Glove Box Door or under Instrument Panel for S600 models.

### CIRCUIT BREAKERS D-500, 600, 800, W600, S600

Circuit	Amp	Location
Headlights .....	20	Integral with Switch
Windshield Wipers .....	6	Integral with Switch
Clearance Identification and Side Marker Lamps .....	15	Fuse Box
Auxiliary Circuit Tractor Trailer .....	15	*
Electric Shift .....	8	*
Low Air or Vacuum Warning Buzzer .....	5	*
Spring Brake and/or Trailer Emergency		
Stop Lamp Switch .....	15	*
Trailer Clearance and Identification Lamps .....	15	*

\*Under instrument panel, mounted on plate by fuse box.

### EXTERIOR LIGHT BULBS

	D and W 100-200-300	D500, 600, 800 W600, S600
Park and Turn Signal Lamp	1157	—
Turn Signal (Lolipop) Lamp	—	1156
Turn Signal (Sno-Fiter) Lamp	1157	—
Headlamps	6014	6014

## 8-122 WIRING DIAGRAMS

	D and W 100-200-300	D500, 600, 800 W600, S600
Auxiliary Headlamps (Sno-Fiter)	6015	—
Back-Up Lamps (All Except Sweptline)	1156	1156
Sweptline	93	—
Separate License Plate Lamp (All Except Rear Bumper)	1155	—
Rear Bumper License Plate Lamp	67	—
Tail, Stop and Turn Signal Lamp	1157	1157
Front Side Marker Lamp	194	194
Rear Side Marker Lamp	194	194
Front Identification and Clearance Lamp	194	194
Cargo Lamp	1003	—

### INTERIOR LIGHT BULBS

#### D and W 100, 200, 300

Dome Lamp	1004
Glove Box Lamp	1816
Instrument Cluster Lamps	158
Ash Tray Lamp	1445
Wiper and Heater Control Lamps	1892
Automatic Transmission Indicator Lamp	161
Cargo Lamp Indicator Lamp	1892
Tachometer Lamp	1816
Clock Lamp	1816
Courtesy and Map Lamp	90

#### D500, 600, 800, W600

Dome Lamp	1004
Instrument Cluster Lamps	158
Wiper and Heater Control Lamps	1892
Vacuum Gauge Lamp	57
Voltmeter Gauge Lamp	53
Air Pressure Gauge Lamp	57
Tachometer Lamp—Electric	57
Mechanical	67
Two Speed Axle Shift Indicator Lamp	57

### WIRING DIAGRAMS

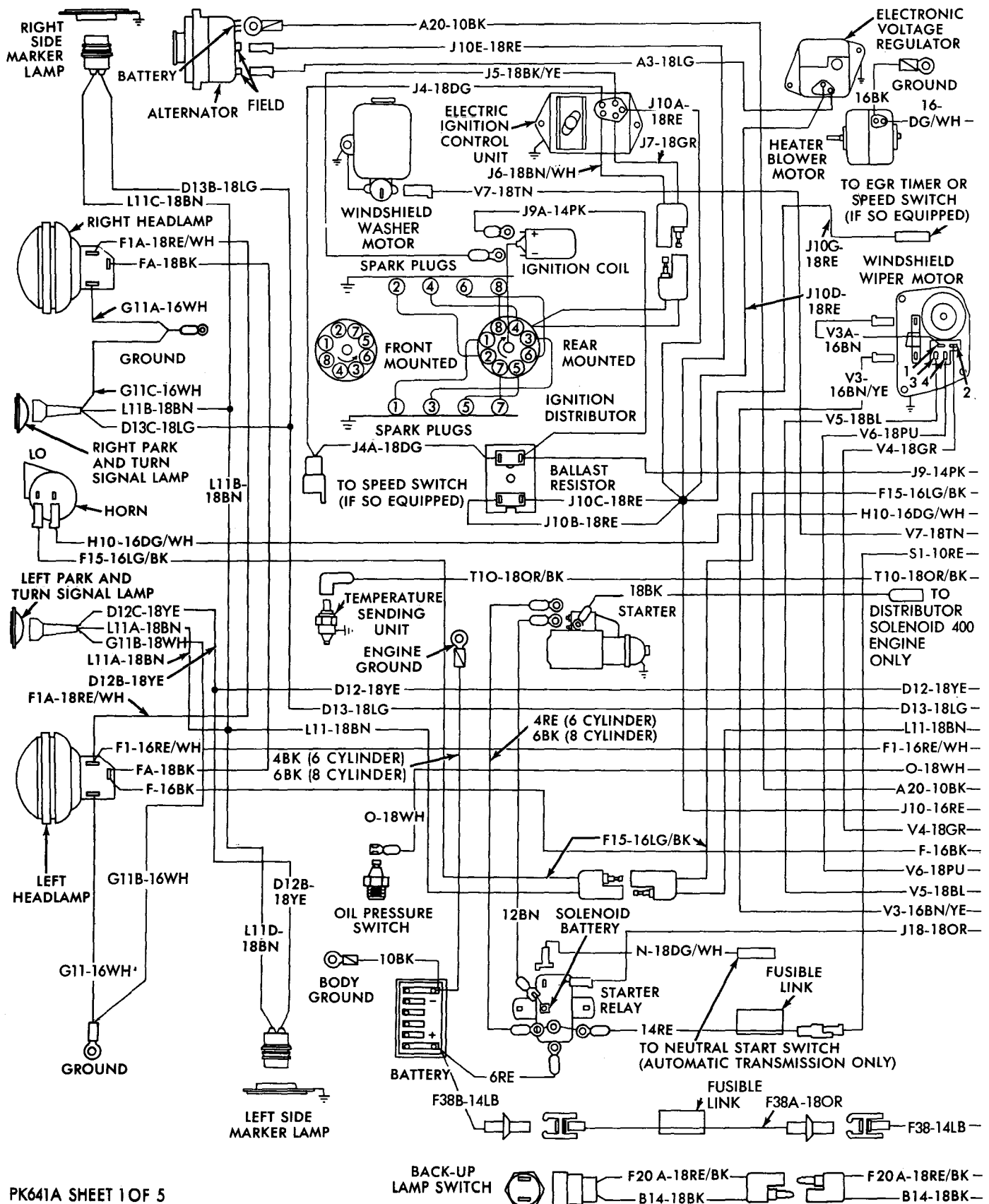
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COLOR CODE			
BK	BLACK	OR	ORANGE
BN	BROWN	PK	PINK
DB	DARK BLUE	RE	RED
LB	LIGHT BLUE	TN	TAN
BL	BLUE	PU	PURPLE
DG	DARK GREEN	GR	GRAY
LG	LIGHT GREEN	WH	WHITE
GN	GREEN	YE	YELLOW
WIRES WITH TRACERS TYPICAL EXAMPLES			
BK/WH	BLACK WIRE WITH WHITE TRACER	YE/BK	YELLOW WIRE WITH BLACK TRACER

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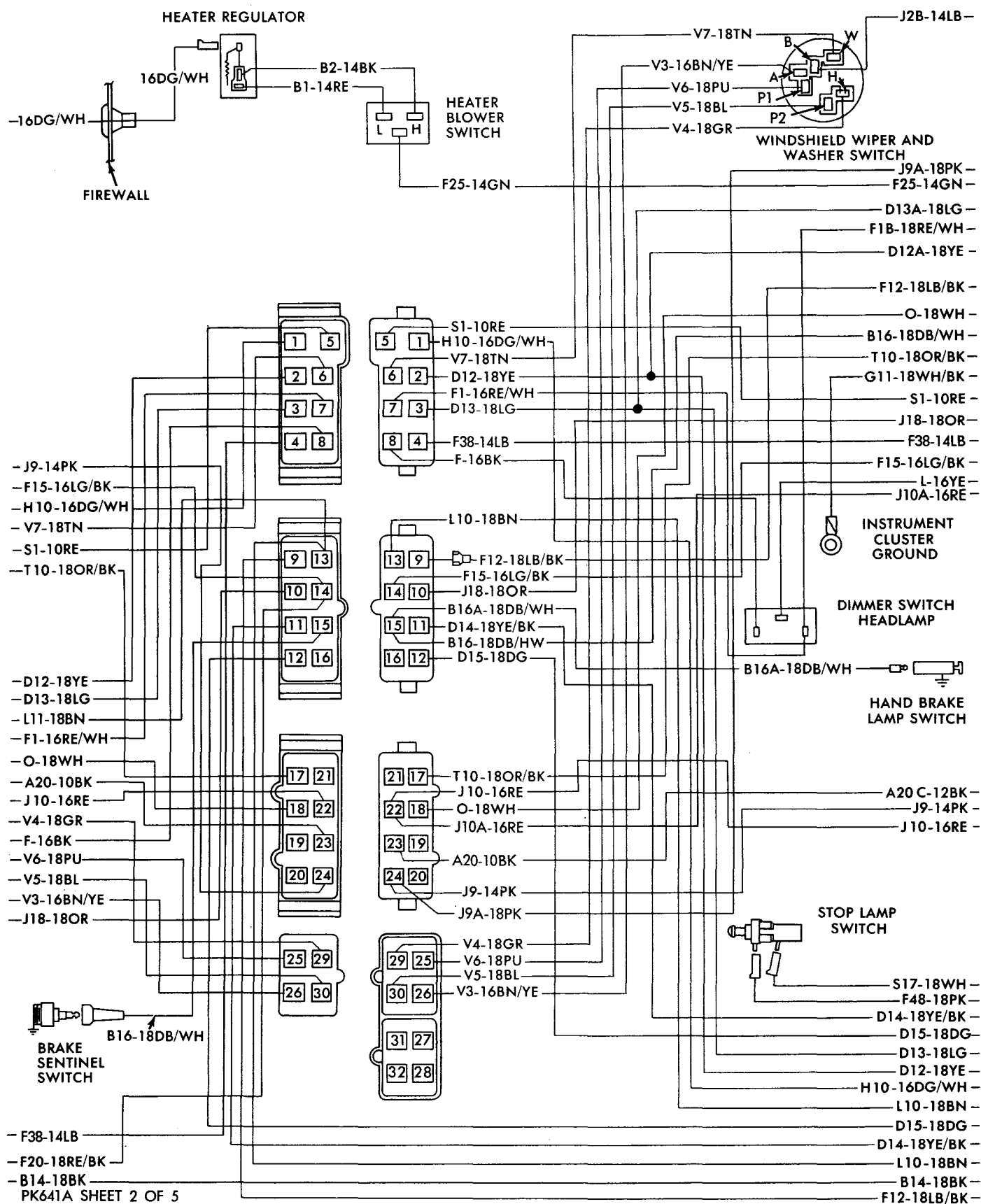
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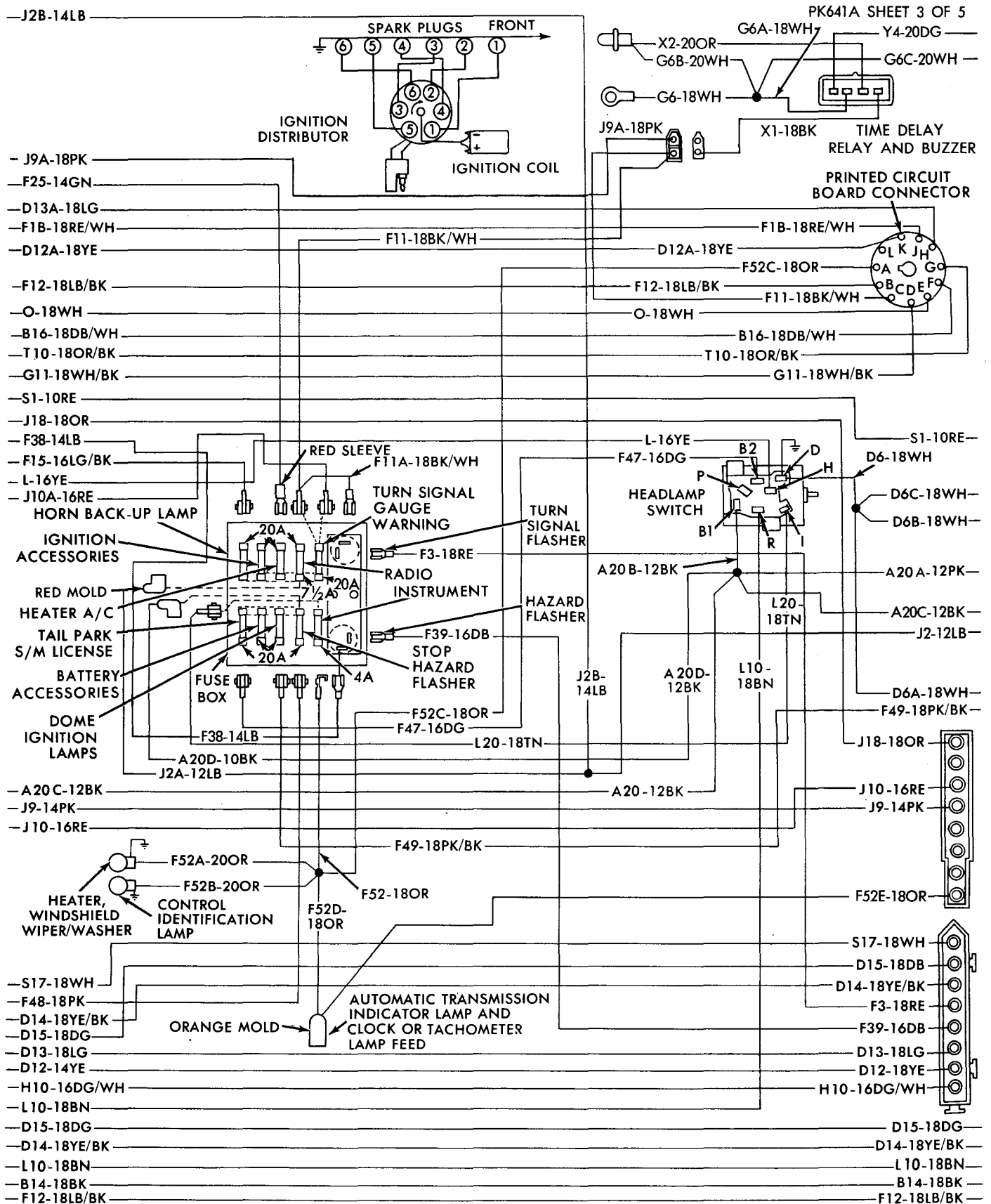


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D and W100-200-300 Wiring Diagrams Without 100 AMP Alternator

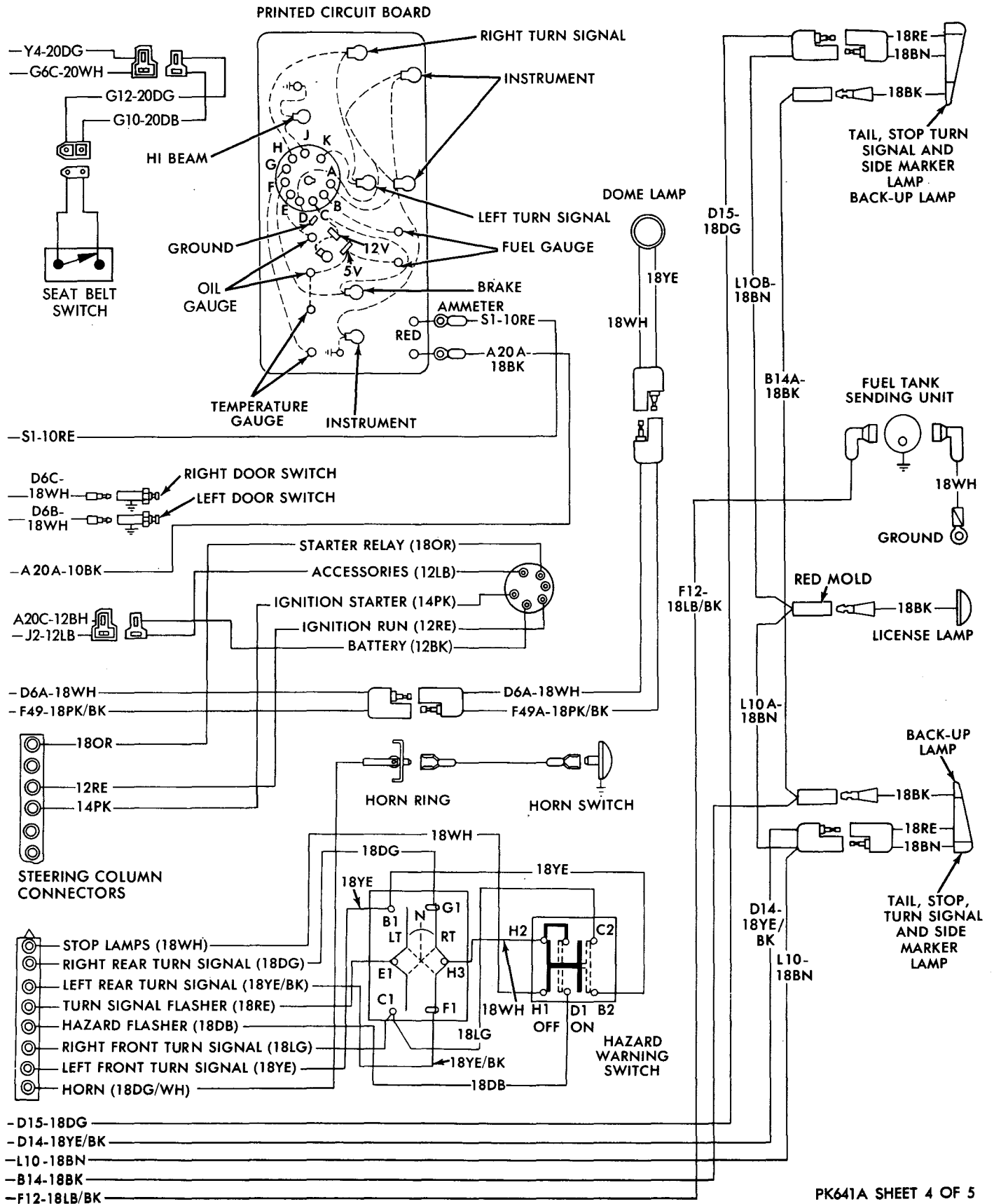
# 8-124 WIRING DIAGRAMS



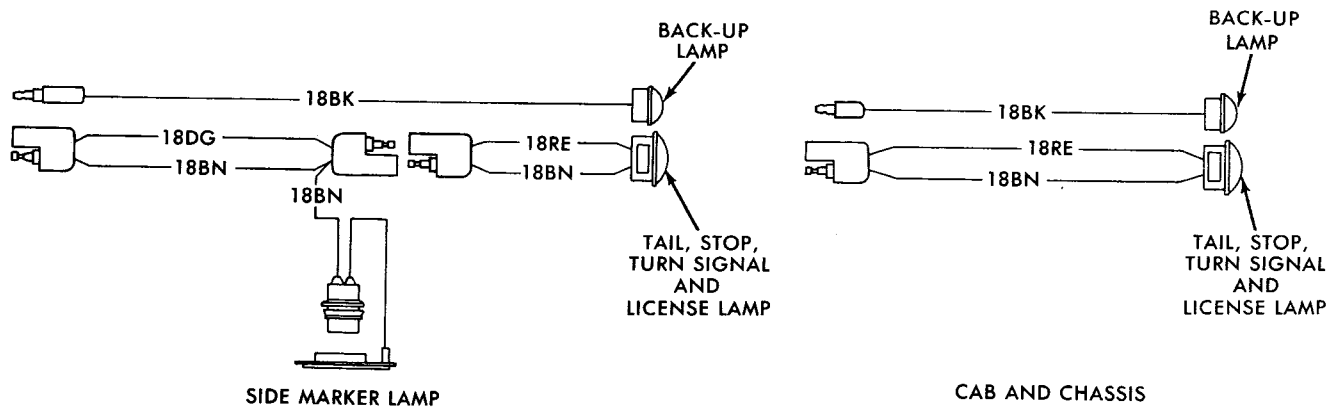
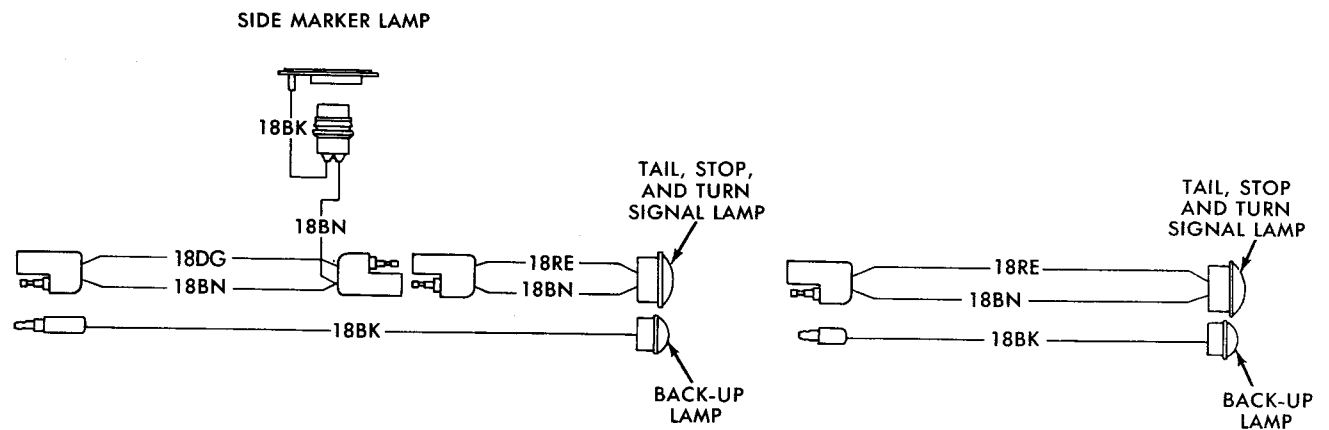




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UTILINE BOX