SECTION A

CRUISE MASTER

CONTENTS

DIVISION II

DESCRIPTION AND OPERATION

65-1 DESCRIPTION AND OPERATION OF CRUISE MASTER

a. Introduction

Cruise Master is a driver operated cruise control system. It may be either factory or dealer installed.

b. Driver Operation

43-44000 SERIES: 1. *Engagement* - The driver accelerates to the speed at which he desires to cruise and momentarily operates the cruise control engagement switch to the ON position. The cruise system immediately takes over speed control and, within engine and vehicle limitation, maintains this speed regardless of changes in normal terrain.

The engagement switch performs these functions: (a) When moved to the ON position, it engages the system. (b) When released completely, it holds the system in engagement. (The lowest speed at which the system should be used is 40 MPH.)

When the system is engaged the green cruise lamp will light, indicating that the system is engaged.

2. *Disengagement* - The system automatically disengages whenever the brake is depressed. It may be disengaged by operating the engagement switch to the OFF position or turning the ignition switch OFF.

The cruise lamp will go out, indicating that the system is no longer in use.

3. *Speed Adjustment* (a) Upward - Depress the accelerator pedal to the new desired speed. Then operate the cruise control engagement switch to OFF and then ON direction and release.

(b) Downward - Disengage the system by operating the engagement switch in the OFF direction. Decelerate to the new desired speed; then operate the switch to the ON position.

4. *Override* - The accelerator pedal may be depressed at any time to override the cruise system. Release of the accelerator pedal will return the car to the previous cruise speed.

45-46-48-49000 SERIES: 1. *Engagement* - The driver accelerates to the speed at which he desires to cruise and depresses and releases the cruise control engagement switch button located at the end of the directional signal lever. The cruise system immediately takes over speed control and, within engine limitation, maintains this speed regardless of changes in terrain.

The engagement switch button performs these functions:

(a) When depressed to the detent, it engages the system.

(b) When depressed fully and held there, it disengages the system.

(c) When released completely, it holds the system in engagement. (The lowest speed at which the system should be used is 40 MPH).

When the system is engaged the green cruise lamp will light, indicating that the system is engaged.

2. *Disengagement* - The system automatically disengages whenever the brake is depressed or the ignition switch turned off.

The cruise lamp will go out, indicating that the system is no longer in use.

3. *Speed Adjustment* -

(a) Upward - Depress the accelerator pedal to the new desired speed. Then fully depress and slowly release the cruise control engagement switch button. The system reengages at the higher speed when the button is released through the detent.

(b) Downward - Disengage the system by depressing the engagement switch button fully and holding it there until the car has decelerated to the new desired speed; then release the button slowly.

4. *Override* - The accelerator pedal may be depressed at any time to override the cruise system. Release of the accelerator pedal will return the car to the previous cruise speed.

c. Cruise Master Units

(Figures 65-1, 2 & 3 show the units in the installed position on the three series of vehicles.)

1. *The engagement switch,* which is mounted to the right of the speedometer on the instrument panel, on the lower series cars and located at the end of the directional signal lever on the upper series cars, is used to control the system and for upward and downward speed adjustments.

2. *The speed transducer,* which is mounted in the speedometer cable line, is a combination speed sensing device and control unit. When engaged, it senses vehicle speed and positions the power unit to maintain the selected speed.

3. *The power unit,* which is mounted under the hood, is connected by a ball chain to the throttle linkage. It opens or closes the throttle as dictated by the speed transducer.

4. *The cruise brake release switch,* which is mounted on the brake pedal bracket, disengages the system electrically and pneumatically when the brake pedal is depressed.

5. *The cable and casing assemblies* drive the transducer and speedometer.

6. *The lamp relay* is used to light the cruise lamp.

d. Operation of Cruise Master

The transducer consists of two sub-assemblies: The magnet housing assembly and the solenoid and clutch housing assembly. The magnet housing assembly contains the drive adapter assembly, magnet and shaft assembly, and the speed disc field plate and spindle assembly. See Figure 65-4.

The solenoid and clutch housing contains the orifice tube and connector assembly, the control valve, the engagement clutch spring, the low speed switch, the engagement solenoid assembly, and the air filter assembly.

The power unit consists of a diaphragm and return spring. The vacuum level of the sealed chamber is controlled by the transducer. The ball chain connects directly to the throttle linkage to control carburetor throttle position. See Figure 65-5.

When the driver engages the cruise control engagement switch at speeds above the recommended minimum operating speed of 40 MPH, the electrical circuit to the transducer solenoid is complete through pins 2 and 3, thus energizing the solenoid and engaging the cruise system. See Figure 65-6. When the switch is released, it returns to its normal position and the electrical circuit to the solenoid is completed through pins 2 and 1. Note that in this position the only circuit to the solenoid is through resistance R1. The current flow through the resistor is not sufficient to *engage* the solenoid, but it is sufficient to *hold* the solenoid in the engaged position, once it has been engaged through the other circuit.

When the system is disengaged all voltage is removed from the transducer solenoid. However, after either switch (cruise release brake or cruise control switch) is returned to the normal position (and the ignition switch is on), there is current flowing through pins 1 and 2 of the engagement switch. This current is not high enough to engage the solenoid because of the limiting action of resistance R1.

The low-speed switch is open at speeds below 35 MPH, making the system inoperative since the circuit from pin 3 of the engagement switch to the speed transducer solenoid is open and the solenoid cannot be energized.

The cruise lamp relay closes whenever the driver engages the cruise control engagement switch at speeds above the setting of the low speed switch. The cruise lamp relay is energized through pins 1 and 3 of the engagement switch, terminal 1 of the transducer, the transducer low-speed switch, terminal 2 of the transducer, and terminals 1 to ground through the mounting bracket. When the relay coil is so energized, the resultant magnetic field closes the armature contact. The cruise lamp circuit is then complete from relay terminal 2 to ground through the relay mounting bracket. See Figure 65-6.

Energization of the transducer solenoid positions a lock-in cam which allows the clutch spring of the valve, wire, and spring assembly to grasp

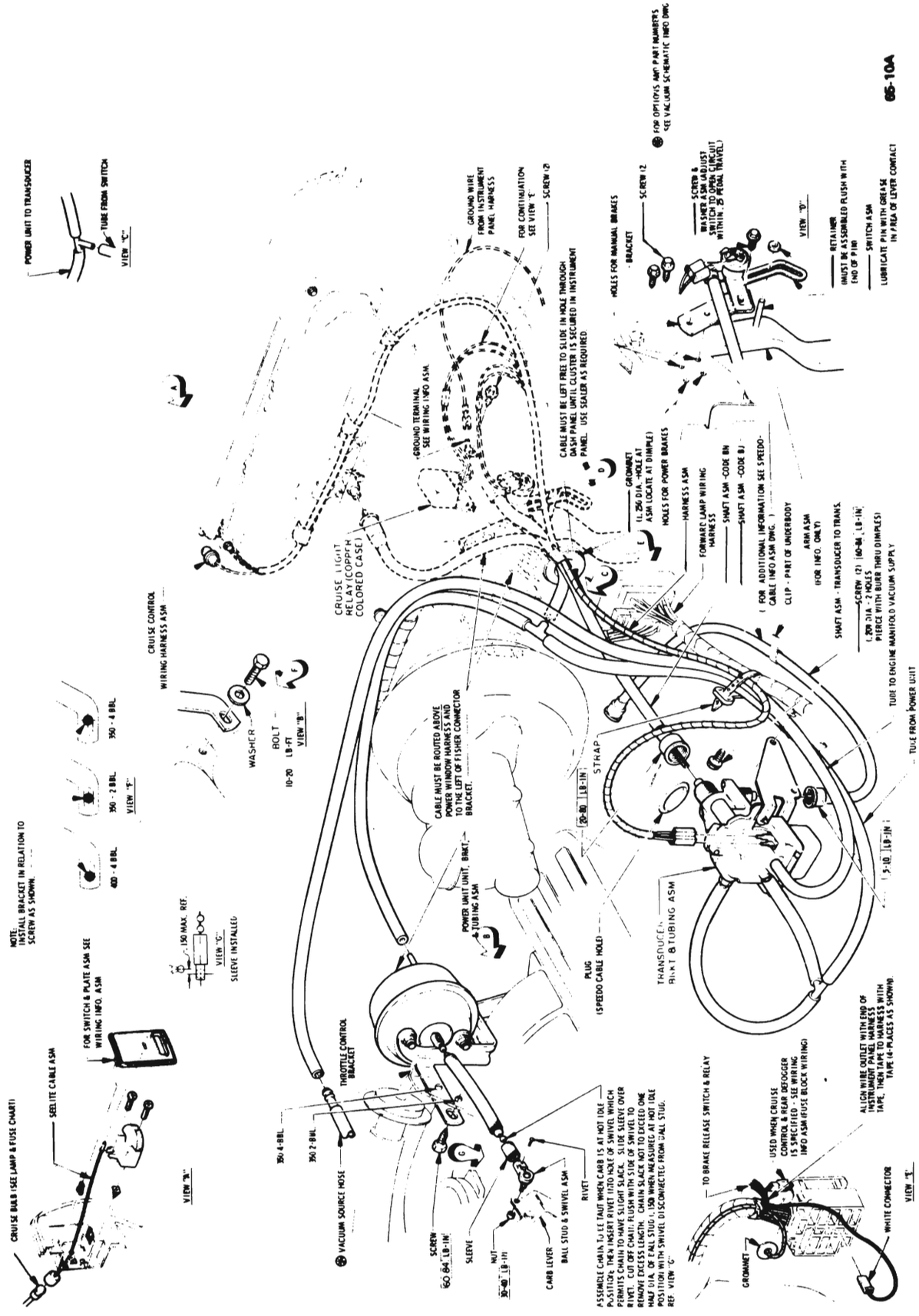


Figure 65-I--Cruise Master
Installation 43-44000 Series

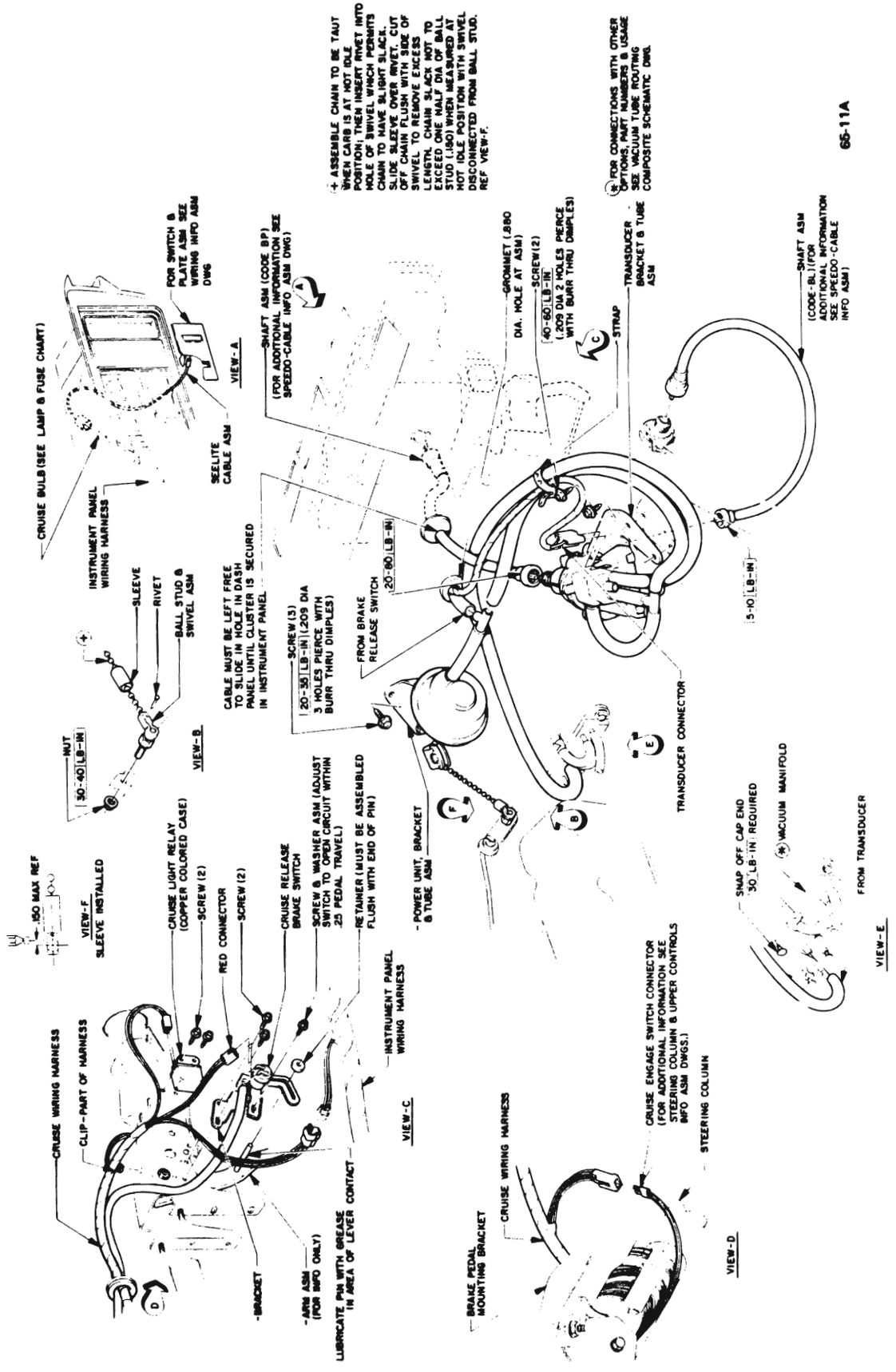


Figure 65-2--Cruise Master
Installation 45-46-48000 Series

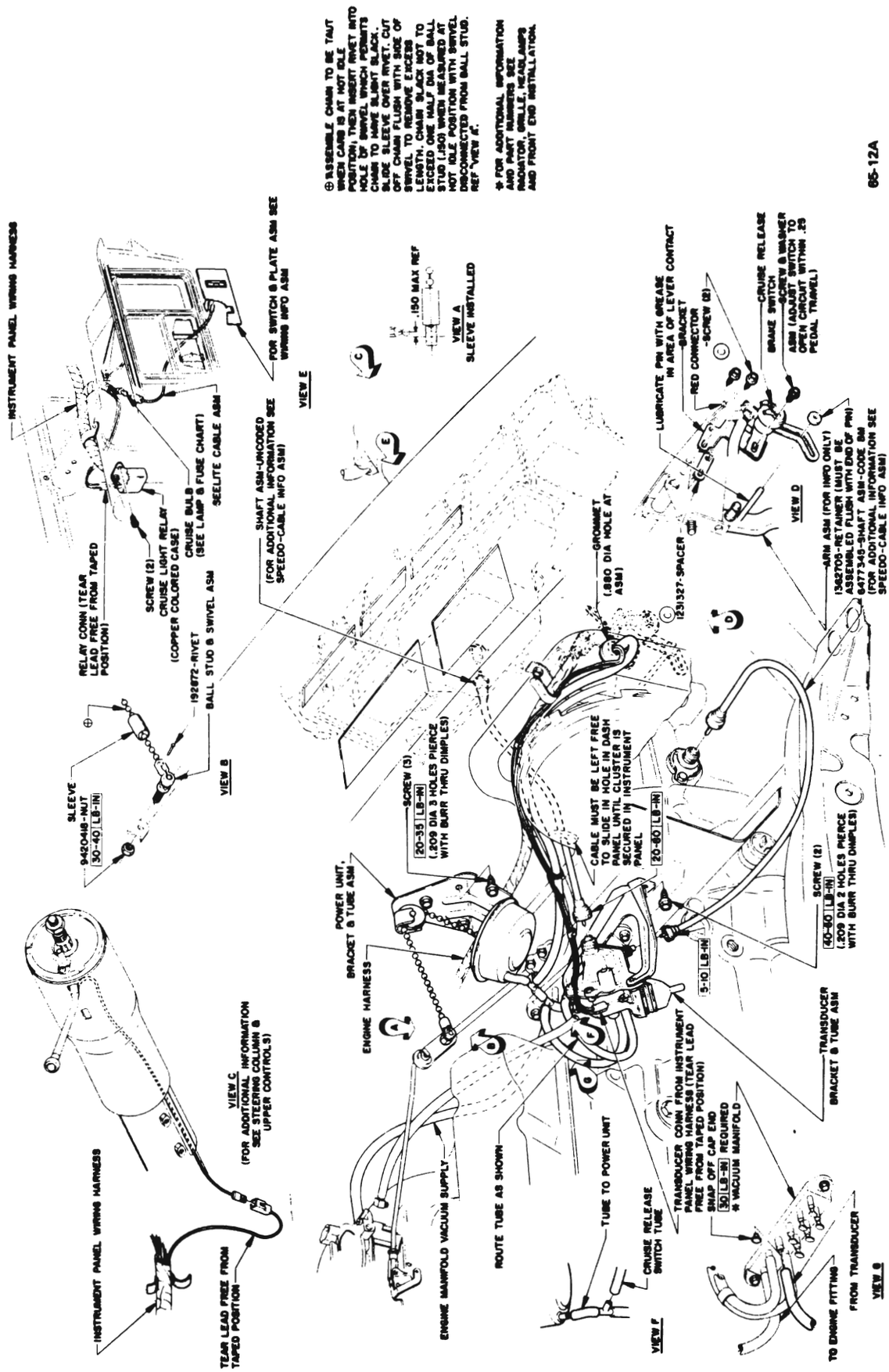
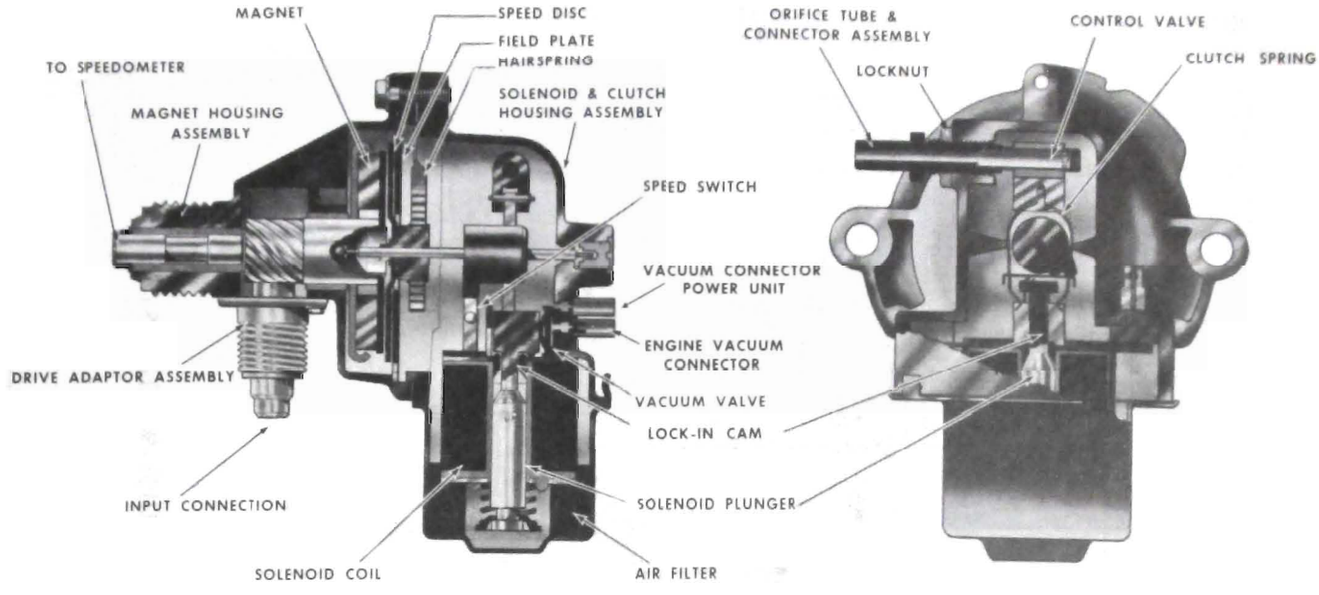


Figure 65-3--Cruise Master
Installation - Riviera



SIDE VIEW SECTION

END VIEW SECTION

Figure 65-4 - Cruise Master Speed Transducer - Section Views

the rubber clutch fixed to the speed disc spindle assembly.

Theoretically the rubber clutch behaves as does a speedometer pointer - that is, it moves either clockwise or counterclockwise in proportion to the speed of the rotating magnet. Since the control valve is mechanically connected to the clutch spring, the valve moves either to the right or to the left, proportional to the speed of the rotating magnet. This motion of the control valve changes the size of the openings in the orifice tube. Also, energizing the transducer positions the vacuum valve within the transducer to connect engine vacuum directly to the power unit. See Figure 65-6

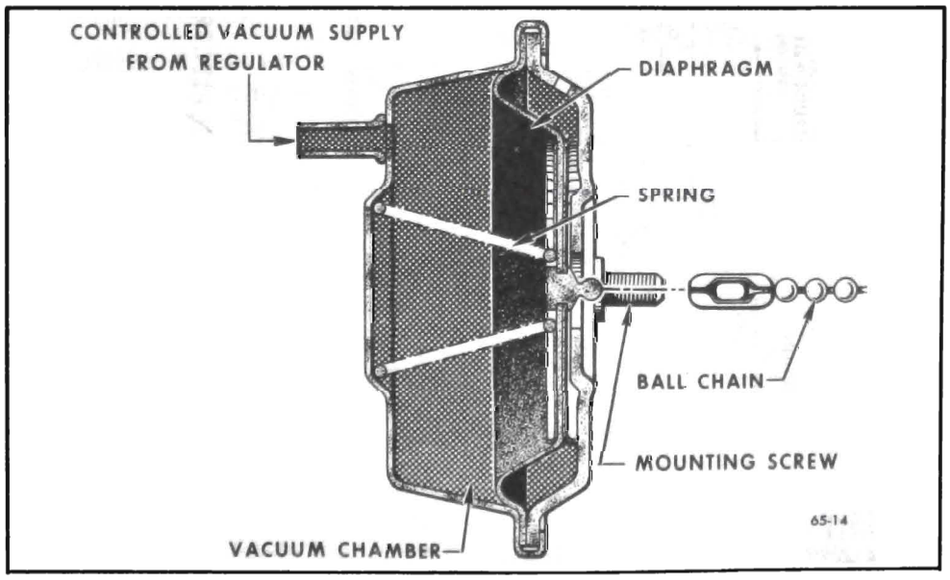


Figure 65-5--Power Unit

The transducer is a device which has two primary functions. First, it is a vacuum switch which, when engaged by the driver, supplies vacuum to a "Tee" fitting. Second, it meters a small variable quantity of air to the "Tee" fitting where it blends with vacuum, thus providing the power unit with controlled vacuum which will maintain the selected speed. If the transducer begins to supply less bleed air (vehicle speed decreasing) the vacuum in the chamber increases and the diaphragm moves toward the vacuum port. If the transducer begins to supply more bleed air (vehicle speed increasing) the vacuum in the chamber drops and the diaphragm moves away from the vacuum port. In operation, at cruise speed, a proper balance of air and vacuum is blended at the "Tee" fitting and is imposed upon the power unit to maintain as "On Speed" cruise condition. See Figure 65-4

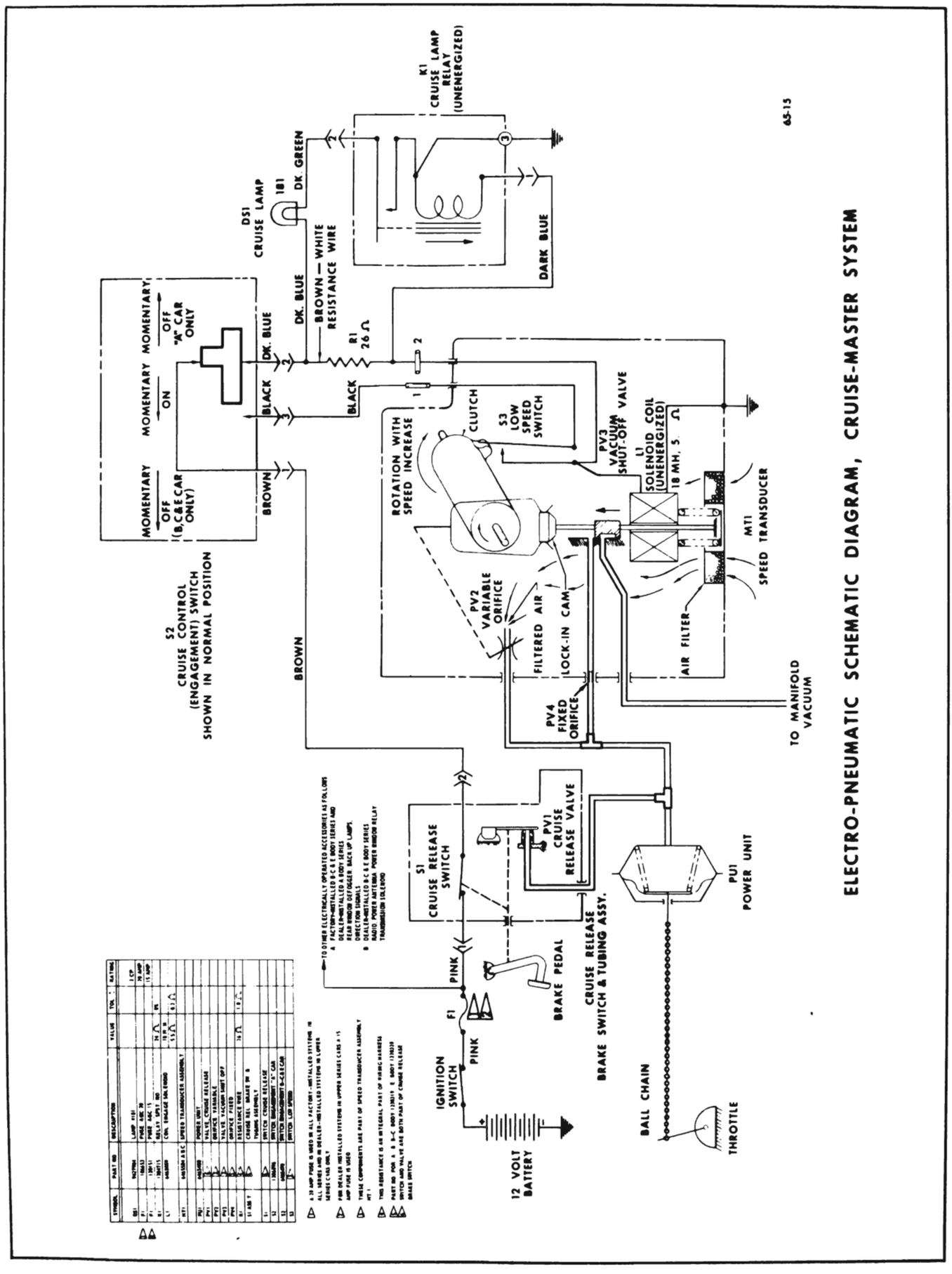


Figure 65-6--Cruise Master Electric - Vacuum Schematic

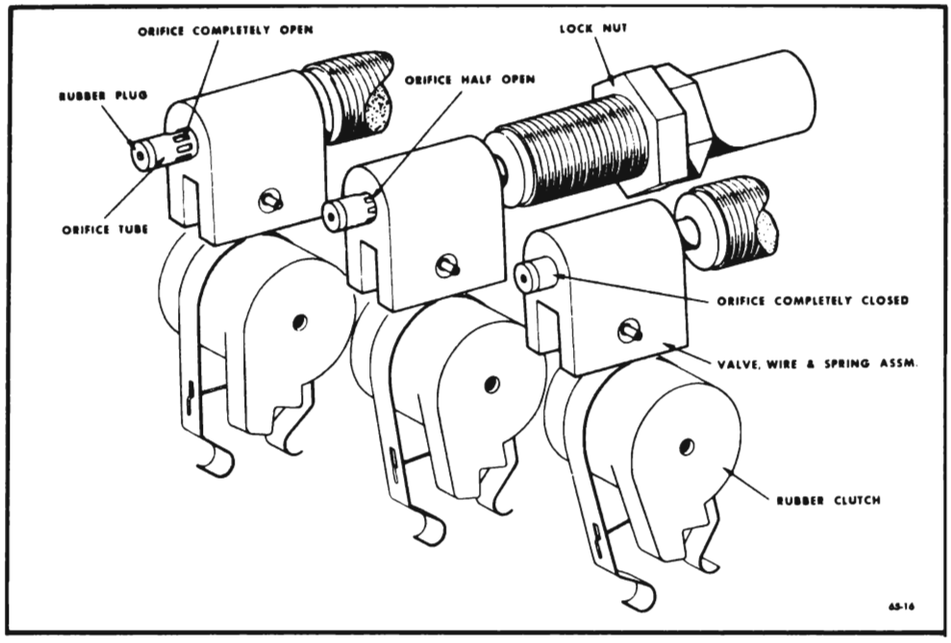


Figure 65-7 - Transducer Air Bleed Orifice Openings

If the car goes upgrade, there is a tendency for speed reduction. When speed reduction occurs (refer to Figure 65-7) the valve, wire and spring assembly moves in the direction which makes the window openings smaller, reducing the amount of atmospheric air to the power unit thereby increasing the vacuum level in the power unit. This draws in the diaphragm, thus increasing the carburetor throttle opening via the connecting ball chain or linkage and maintaining cruise speed.

Conversely, if the car goes down grade, there is a tendency to exceed the set speed. In this case, the valve moves in the direction which increases the size of the window openings. This admits a larger volume of air to the power unit, reducing its vacuum level and in turn allowing the diaphragm to move out and reduce the carburetor throttle opening, thereby maintaining cruise speed under normal terrain conditions.

Both overspeed and underspeed tendencies are immediately corrected since 3 MPH speed change will result in a change in the size of window openings capable of moving the power unit through its complete range. This means that the throttle will be moved through its complete cruise range with a speed change of 3 MPH. This results in accurate control of cruise speed.

65-2 CRUISE MASTER SERVICE PROCEDURES

IMPORTANT: Do not lubricate power unit bead chain or its pully.

a. Power Unit Bead Chain Adjustment

1. Adjust engine hot idle speed and mixture, then shut off engine.

2. Check bead chain slack by unsnapping swivel from ball stud and holding chain taut at ball stud; center of swivel should extend 1/8 inch beyond center of ball stud. See Figure 65-1, 2 or 3.

3. Adjust bead chain slack, if necessary, by sliding sleeve back on chain and removing loose rivet. Move swivel on ball chain until slack is correct, reinstall rivet and again slide sleeve over rivet.

b. Brake Release Switch Adjustment

1. Turn on ignition switch. Connect a test light between one terminal of brake release switch and ground; select terminal where light goes out when brake pedal is depressed.

2. Loosen screw that retains brake release switch to brake pedal support bracket. Position switch so that circuit opens (light goes out) when brake pedal is depressed 1/4 inch.

3. Tighten screw and recheck brake release switch adjustment.

c. Cruise Speed Adjustment

If the car cruises at a speed above or below the engagement speed, this error can be corrected with a simple adjustment of the orifice tube in the transducer. See Figure 65-8.

1. To check cruise speed error, engage Cruise Master at exactly 60 MPH.

2. If car cruises below engagement speed, screw orifice tube outward.

3. If car cruises above engagement speed, screw orifice tube inward.

NOTE: Each 1/4 turn of the orifice tube will change cruise speed approximately one MPH. Snug-up lock nut after each adjustment before testing.

d. Tranducer Air Filter Replacement

1. Replace air filter when it becomes contaminated. When making the replacement:

(a) Place polyurethane filter in bottom of solenoid and filter cover. Note rectangular shape of filter and cover. See Figure 65-9.

(b) Position the solenoid and filter cover and its rubber gasket to the solenoid housing casting and *secure with the cover retaining clips.* Use care to insure that a tight gasket seal is obtained.

e. Removal of upper series cruise Master Actuating Engagement Switch

NOTE: Shift Lever must be in low

1. Remove horn actuator and steering wheel.

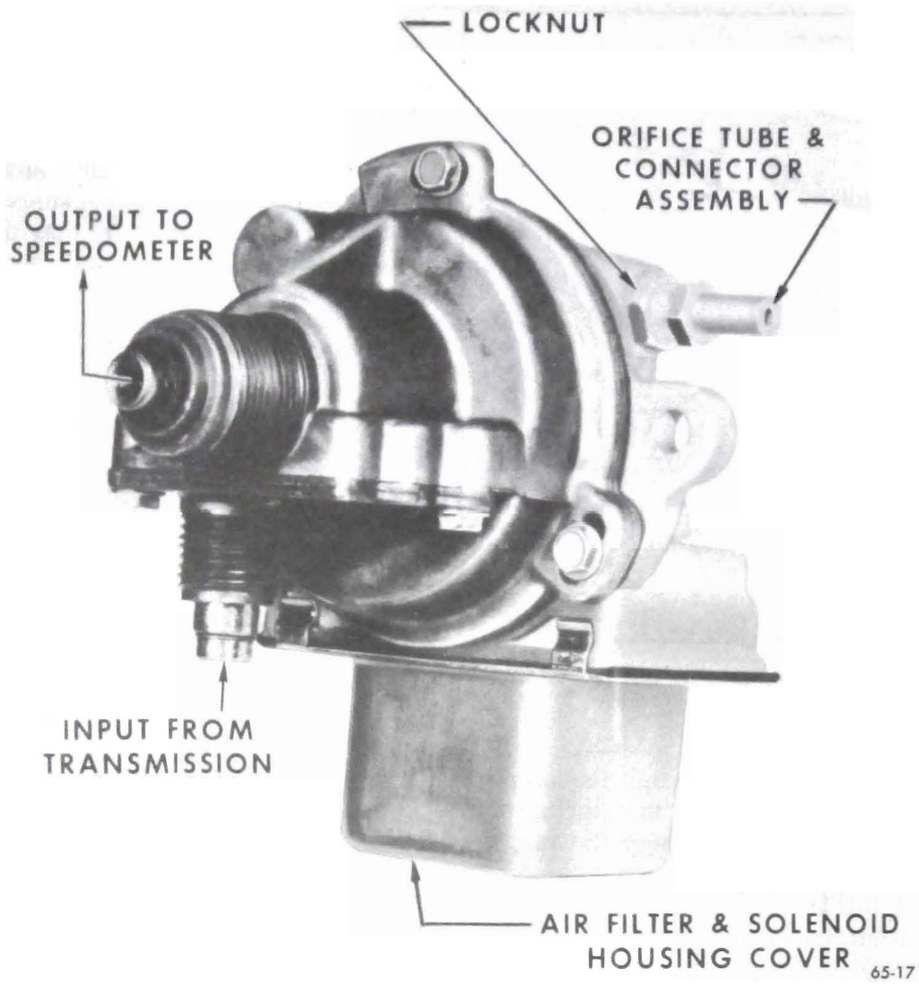


Figure 65-8 - Speed Transducer

2. Remove cover plate (3 screws).

3. Remove turn signal lever screw and conduit from wire assembly.

4. Attach fine pliable wire through hole in connector. Tape end of wire and connector.

5. Pull switch and wire assembly through column. (Threading pliable wire).

6. Attach and tape wire to new connector.

7. Pull connector and wire through column.

8. Replace conduit on wire assembly.

9. Install turn signal lever screw.

10. Install cover plate.

11. Install steering wheel and horn actuator.

65-3 CRUISE MASTER TROUBLE DIAGNOSIS

a. Electrical Check Out

1. Check all fuses and connections.

2. Check adjustment of cruise release brake switch. See paragraph 65-2,b.

3. Check cruise control engagement switch as follows:

Lower Series: (a.) Remove the plate and lens assembly which covers the switch body on the front of the instrument panel.

(b) Remove switch and check out using ohmmeter or test lamp. Refer to Figure 65-6 for location of terminal numbers and for circuit function. Replace switch as required.

Upper Series: (a) Disconnect switch connector from wiring harness at lower part of steering column (refer to Figure 65-6 for location of terminal numbers and for circuit function) as required perform the following test.

Test #1 - Connect ohmmeter between terminal #1 (brown wire) and terminal #2 (blue wire). Continuity shall be maintained until switch is depressed all the way in.

Test #2 - Connect ohmmeter between terminal #1 (brown wire) and terminal #3 (black). No continuity shall be shown; however, when the button is depressed to the detent, continuity shall be indicated. When the button is pressed all the way down, no continuity shall be shown.

Test #3 - Connect ohmmeter between terminal #2 (blue wire) and terminal #3 (black). Button released, no continuity; however, when the button is depressed partially and fully, continuity shall be shown.

4. With the cruise control engagement switch removed as in Step 3. above, disconnect battery and check wiring harness and circuitry as follows:

(a) Connect an ohmmeter at appropriate terminals and junction points as indicated in the schematic diagram of Figure 65-6 to measure the following resistances:

(1) Harness brown-white resistance wire, R1, which is 26 + or - 1 ohms.

(2) Transducer solenoid coil resistance, which is 5.2 + or - 0.2 ohms.

(3) Cruise lamp relay coil resistance which is 24 ohms + or - 2 ohms.

Note that these resistance values are given for parts at normal room temperatures of 68-72° F. Use care to disconnect relay and transducer as

needed to elimate possible parallel paths to ground when making resistance checks. Except for the brown--white resistance wire, all harness wires shall indicate zero resistance (continuity) when checked per the schematic of Figure 65-6. If values of resistance other than those indicated above occur, take corrective action and repair or replace as required.

(b) Check cruise lamp bulb if indicated. Replace if required.

(c) Replace cruise control switch and reconnect battery.

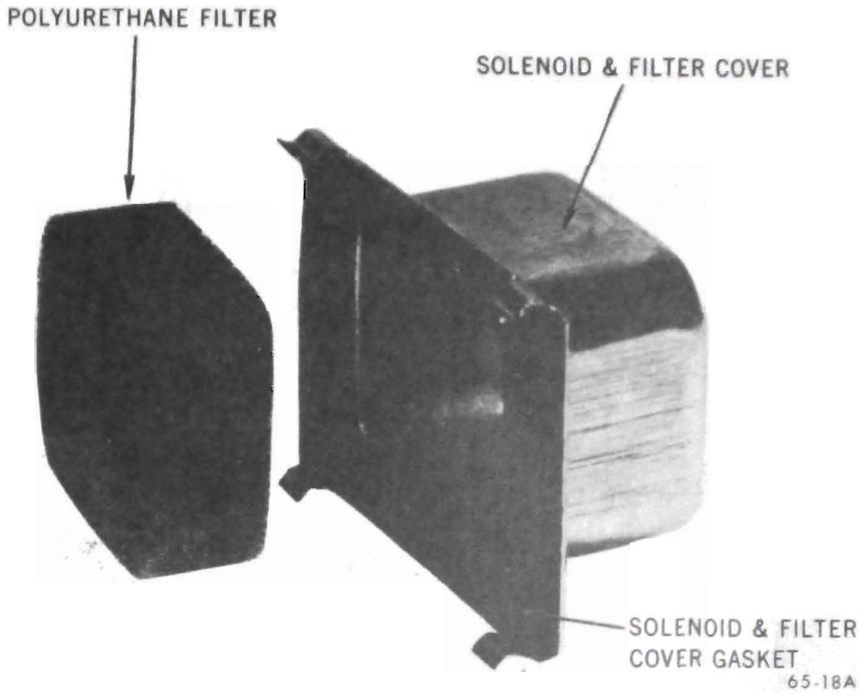


Figure 65-9--Replacing Cruise Master Air Filter

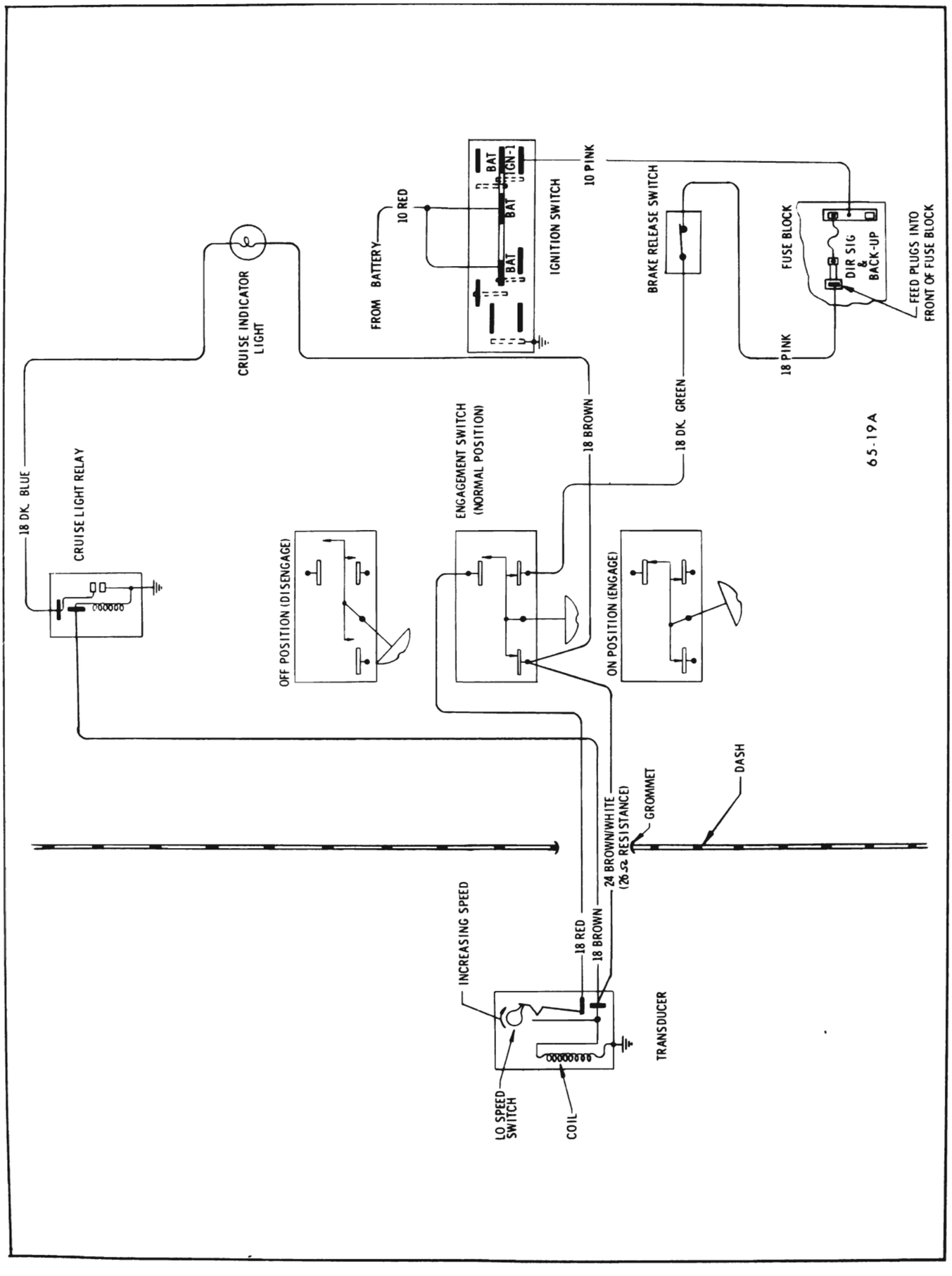


Figure 65-10 - Cruise Master Wiring Diagram - 43-44000 Series

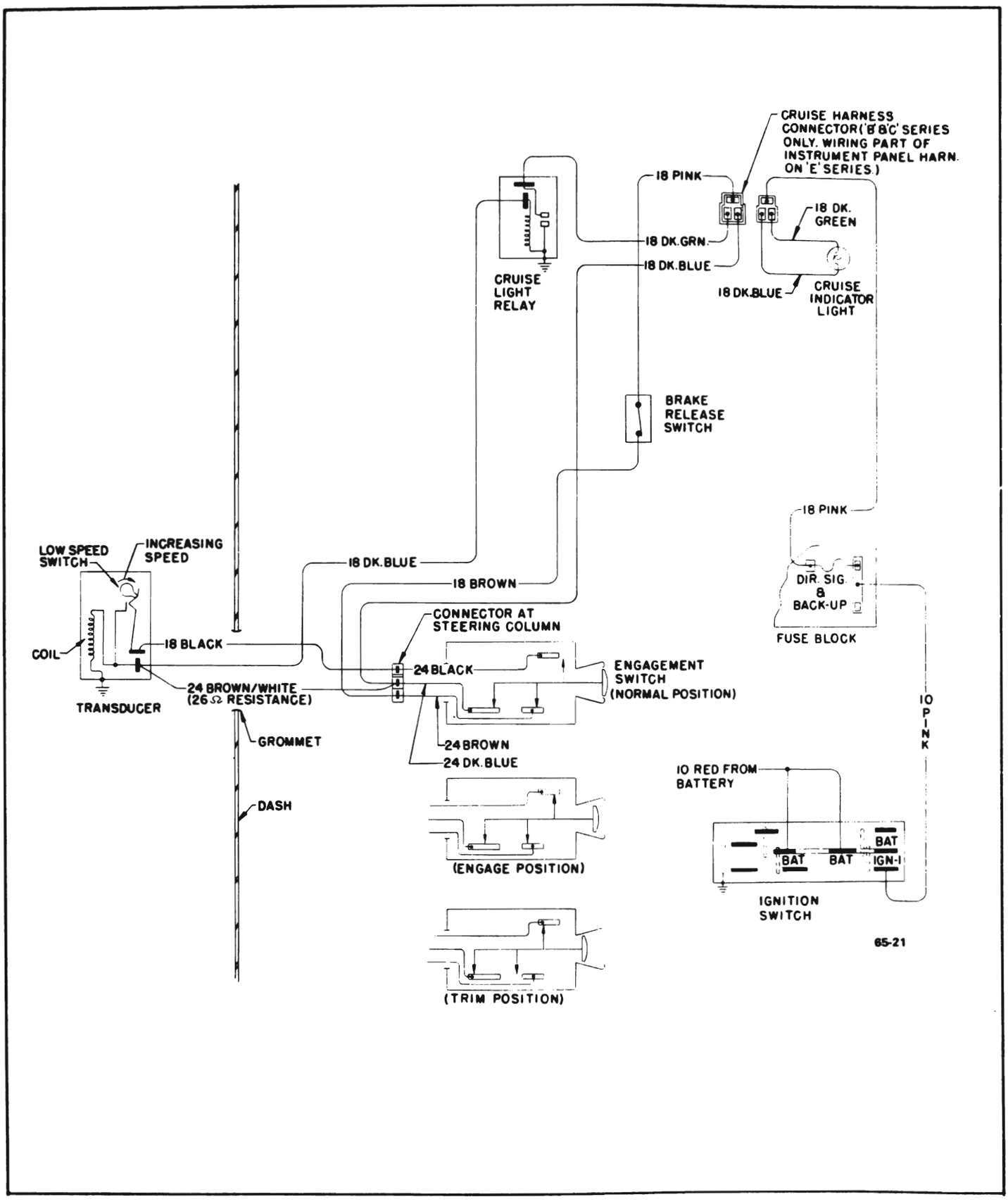


Figure 65-II Cruise Master Wiring Diagram - 45-46-48-49000 Series

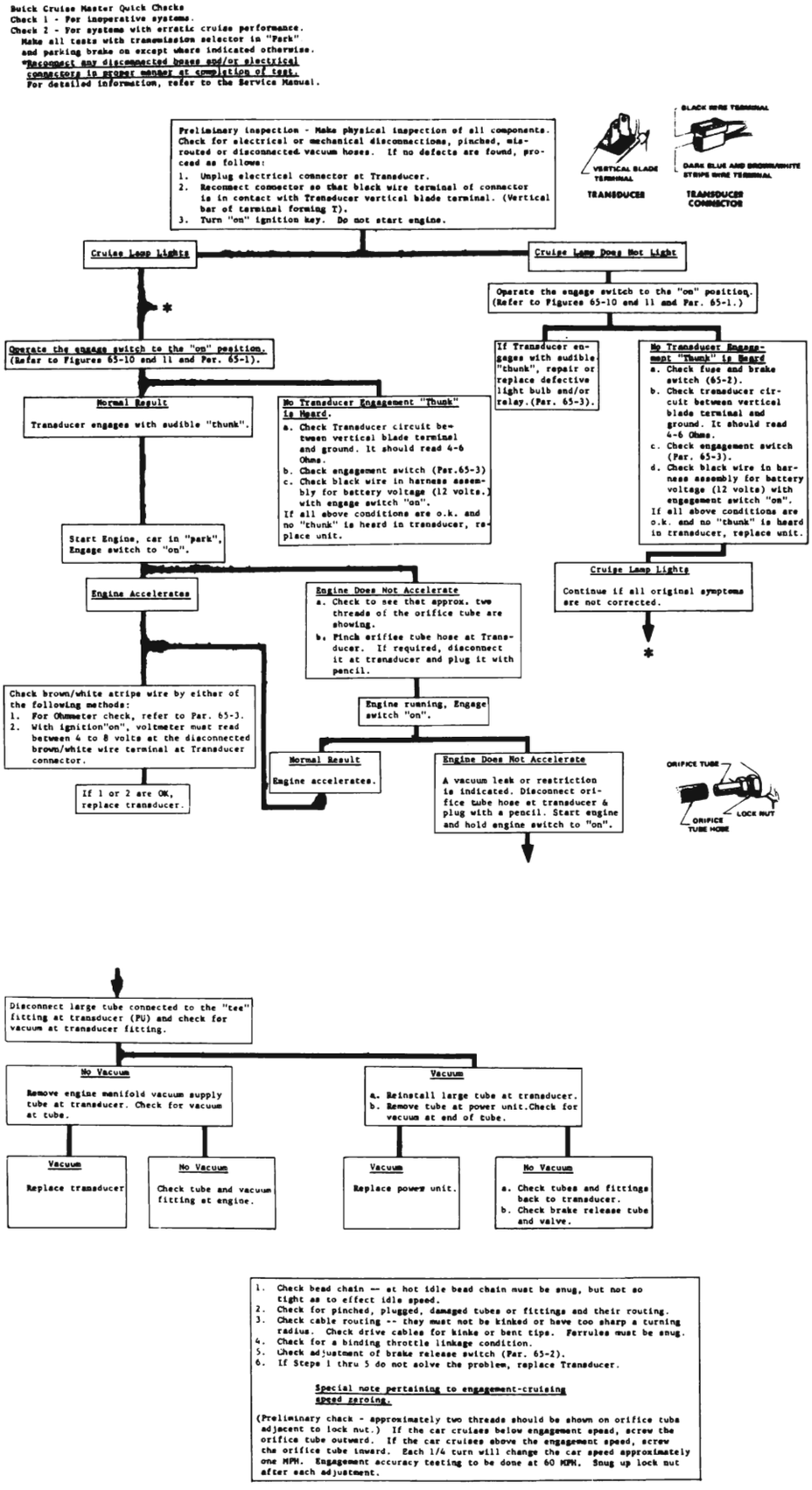


Figure 65-12 Cruise Master Trouble Diagnosis Chart