SECTION G

INSTRUMENT PANEL—MISCELLANEOUS ITEMS

CONTENTS

DIVISION II

DESCRIPTION AND OPERATION

120-26 ELECTRIC CLOCK

The electric clock is mounted in the right of the instrument cluster. The clock wiring circuit is protected by a fuse on the fuse block. Clock lighting is controlled by the rheostat in the lighting switch and is protected by the clock fuse on the fuse block.

a. Clock Time Reset and Automatic Regulation

The electric clock has a sweep-second hand and an automatic regulator. A reset knob extends through the glass at the bottom of the clock dial. To reset the time, pull the knob out and turn in either direction as required.

There is no regulator knob because regulation is accomplished automatically by the action of resetting the time. If a clock is running fast, the action of turning the hands back to correct the time will automatically cause the clock to run slightly slower; if a clock is running slow, the action of turning the hands forward to correct the time will automatically cause the clock to run slightly faster (10 to 45 seconds per day). If clock varies over 10 minutes a day, the clock will never adjust sufficiently and must be disassembled for repair.

A lock-out feature prevents the regulator mechanism from being moved more than once during a rewind period (approximately 2 minutes), regardless of the number of times the clock reset is operated. After clock rewinds, if it is again reset, automatic regulation will take place.

b. Clock Service

The clock manufacturers have established Authorized Service Stations in many cities throughout the United States and Canada. These service stations are prepared to carry out terms of the manufacturer's warranty and also to perform any repairs made necessary through use of clock.

When a clock requires warranty service or repairs other than regulation, it should be removed by the Buick dealer and sent to the nearest authorized service station. The manufacturer's warranty is void if repairs have been attempted outside of an authorized service station.

120-27 FUEL GAUGE SYSTEM— DESCRIPTION AND OPERATION

The gasoline gage system consists of a dash unit (located in the instrument cluster), a tank unit (located in the gasoline tank), a wire between these two units, and a wire to supply battery voltage to the dash unit. See Figure

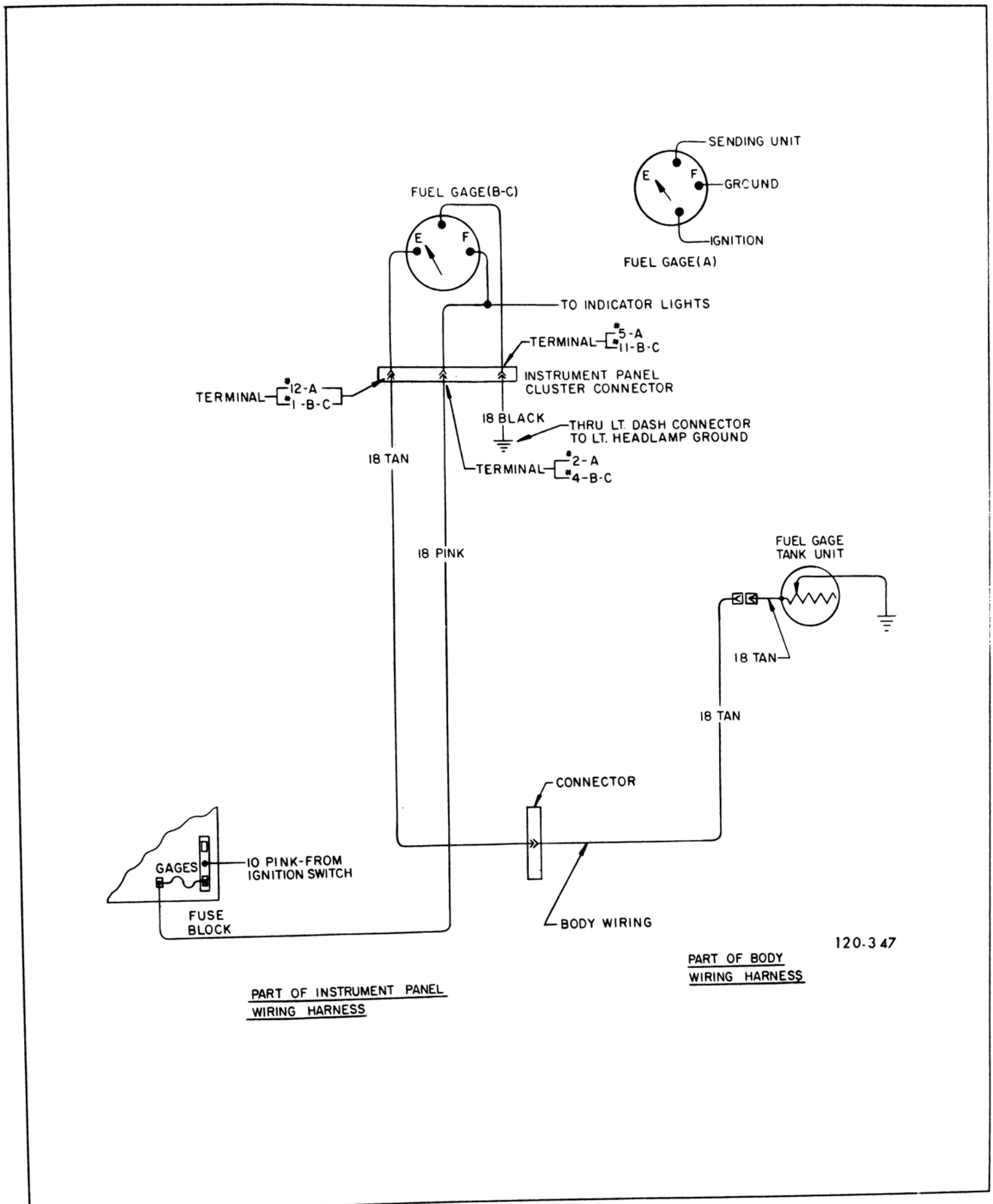

Figure 120-37—Fuel Gauge Wiring Diagram

120-37. The single tank unit terminal is connected to one dash unit terminal with a tan wire. The other dash unit terminal is connected to the ignition switch, through the "GAGES" fuse, with a pink wire, so that voltage to energize the system is supplied only when the ignition switch is turned on. The dash unit has a balanced-type pointer; when the ignition is turned off, the pointer may come to rest any place on the dial.

The dash unit pointer is moved by changing the balance between the magnetic pull of three coils in the unit. This balance is controlled by action of the tank unit which contains a variable rheostat, the value of which varies with movement of a float. The tank unit is mounted in the tank so that the float rises and falls on the surface of the gasoline. The float is adjusted to provide approximately 1 to 3 gallons reserve when the dash unit pointer is at the "E" position.

When the ignition switch is "On" and the float is in the full position (maximum resistance for the tan wire to ground), the current flow to ground is through the resistor, empty coil, the full coil and the bucking coil. Due to the fact that the bucking coil opposes the empty coil, the full coil has the stronger magnetic pull, and the dash unit pointer is pulled to the "F" position. When the float is in the empty position (no resistance for tan wire to ground), the current flow is through the resistor, the empty coil and the tan wire to ground at the tank unit. The dash unit pointer is thus pulled to the "E" position.

120-28 SPEEDOMETER

a. Speedometer Heads

The speedometer head has a magnetic speed indicator and a gear driven odometer. It is driven by a flexible cable connected to a worm gear in the transmission rear bearing retainer.

The speed indicating portion of the speedometer operates on the magnetic principle. There is a permanent magnet in the speedometer head which rotates at the same speed as the cable. This magnet exerts a pull on a speed cup causing it to move through an arc in direct ratio to the revolving magnet speed. A pointer is attached to the speed cup spindle to indicate speed on the speedometer dial. A calibrated hair spring (part of speed cup) opposes the magnetic pull on the speed cup so the pointer indicates speed accurately; this spring also rotates the cup and pointer to zero when the car stops.

b. Speedometer Buzzer

The speedometer buzzer consists of a buzzer which may be adjusted by the driver to sound at any speed between 30 and 120 MPH by turning a knob at the left of the speedometer face. The speed at which the buzzer is set is indicated by a special pointer in the speedometer face.

The safety-buzzer electrical circuit starts at the clock fuse on the fuse block. Since this fuse also protects the clock, a functioning clock indicates that this fuse is OK. From the fuse, an orange wire carries the current to a buzzer. After passing through the buzzer contacts, a very small amount of current goes through a resistor to ground and the rest of the current passes through a light blue wire to the connector plug located on the speedometer case.

In the speedometer, current is conducted from the separate buzzer connector through a wire to an insulated pin in the lower end of the buzzer pointer. As the speedometer pointer moves up to coincide with the buzzer pointer, a light grounding hair spring on the lower end of the speedometer pointer makes contact with the "hot" insulated pin on the safety-buzzer pointer.

This grounds the circuit, causing the buzzer to buzz. If the car speed is increased beyond the buzzer setting, the insulated pin on the safety-buzzer pointer "picks-up" the hair spring as the speedometer pointer passes under the buzzer pointer and the light grounding hair spring winds-up slightly.

DIVISION IV
TROUBLE DIAGNOSIS

120-29 FUEL GAUGE—TROUBLE DIAGNOSIS

If the gasoline gage does not operate properly, the dash unit, tank unit wiring and the tank unit should be separately tested to determine which is at fault. The units and wiring may be tested by using Gas Gage Tester J-22344. To use the tester, disconnect the tan wire from the gas gage tank unit terminal and plug the tester into the end of the tan wire. Connect the other tester lead to a good ground. With the tester switched into the empty position, the gas gage dash unit pointer should touch the empty line or rest slightly below; with the tester switched to the full position, the gas gage dash unit pointer should touch the full line or rest slightly above it.

If the gas gage system fails to pass these two tests, refer to the following chart to diagnose the trouble.

120-30 SPEEDOMETER—TROUBLE DIAGNOSIS

a. Checking Noisy Speedometer

1. Jack up rear wheels in a safe manner and close car windows to exclude outside noises.

DASH UNIT NEVER READS EMPTY OR DASH UNIT READS FULL AT ALL TIMES WITH IGNITION ON

1. Check for disconnected or loose tank unit feed wire at tank unit.
2. Connect Gas Gauge Tester J-22344 to tank unit feed wire and observe dash unit.

No Improvement

1. Check cluster fuse.
2. Check for proper connections at: Dash unit to printed circuit. I.P. harness to printed circuit, Flat wire to I.P. harness. Trunk harness to flat wire.
3. Remove dash unit and check (see bench check).

Dash Unit Reads Okay

1. Check ground wire from tank unit to trunk floor pan for continuity.

DASH UNIT READS EMPTY AT ALL TIMES WITH IGNITION ON

1. Disconnect tank unit feed wire. Dash unit unit should now read full.

Gauge Reads Full

1. Check for grounded tank unit lead.
2. Remove tank unit and check (see bench check).

Gauge Does Not Read Full

1. Check cluster fuse.
2. Check for proper connections at: Dash unit to printed circuit. I.P. harness to printed circuit.
3. If dash unit is okay, check for opens in printed circuit or shorts due to pinched wires in the body harness.
4. Remove dash unit and check (see bench check).

ERRATIC FUEL GAUGE READINGS AND OFF CALIBRATION COMPLAINTS

(Gauge fluctuation during acceleration and deceleration is normal.)

Check the following for loose connection:

1. Dash unit mounting screws.
2. I.P. harness to printed circuit.
3. I.P. harness to flat wire.
4. Flat wire to trunk harness.
5. Feed wire to tank unit.
6. Tank unit ground to body.

NOTE: Many fuel gauge tank units and dash units are replaced because of poor diagnosis or lack of knowledge of the variables in the system. For example, some owners complain that when their gauge reads empty the tank cannot be filled to the capacity stated in the owner's manual.

Possible reasons:

1. Empty fuel reserve of 1 to 3 gallons.
2. Gas station attendant did not take time to completely fill the tank.
3. Car was filled on a hill or with a heavy trunk load causing the tank vent pipe to be blocked and therefore preventing the tank from being completely filled.

DASH UNIT NEVER READS FULL

1. Connect Gas Gauge Tester J-22344 to tank unit feed wire and observe dash unit.

Dash Unit Reads Okay

1. Reconnect tank unit feed wire to tank unit.
2. Completely fill fuel tank.
3. Note dash unit pointer with engine running.
4. If pointer still does not go to full, disconnect feed wire to tank unit.
5. With ohmeter check resistance of tank unit. Should read 88 to 92 ohm with a full tank.
6. If low resistance, check tank mounting area for damage.

Gauge Does Not Read Full

1. Check cluster fuse.
2. Check for proper connections at: Dash unit to printed circuit. I.P. harness to printed circuit.
3. If dash unit is okay, check for opens in printed circuit or shorts due to pinched wires in the body harness.
4. Remove dash unit and check (see bench check).

DASH UNIT DEAD BETWEEN EMPTY AND FULL WITH IGNITION ON (SAME PLACE AT ALL TIMES)

1. Disconnect tank unit feed wire. With voltmeter, check feed wire voltage. Should read 3-4 volts.

No Voltage

1. Indicates open circuit on hot side of dash unit.
   a. Check cluster fuse.
   b. Check for proper connection at: Dash unit to printed circuit. I.P. harness to printed circuit.
2. If circuits are okay, remove dash unit and check (see bench check).

Voltage

1. Connect gas gauge checker to tank unit feed wire and observe dash unit.
2. If still dead, remove dash unit and check (see bench check).

NOTE: The dash unit may be any place with the ignition off.

2. With transmission in direct drive, run slowly from 0 to 50 MPH and back to 0, noting speed range where noise appears.

3. Apply brakes and shift transmission to park position, then run engine through same speed range as before.

4. If the noise continues even with the transmission output shaft stationary, something other than the speedometer installation is at fault.

5. If noise disappears with transmission stationary, check further for cause of noise by checking for proper installation of speedometer cable as shown in Figure 120-38 through 42.

6. If cable installation is okay, next remove inner cable from casing. Lay inner cable on clean paper to keep dirt from cable lubricant. Reconnect empty casing to speedometer and recheck for noise at various speeds. If noise still continues, noise is coming from transmission rather than from speedometer or cable.

7. If noise stops with inner cable removed, speedometer or cable is at fault. Inspect cable as described in subparagraph c.

b. Inspection of Speedometer Cable and Casing

If the speedometer installation appears to be noisy or the speed indicator wavers, inspect the cable casing for damage, sharp bends, for being out-of-position in the supporting clips. See Figures 120-38 through 42. If casing is in good condition and properly installed, remove inner cable for inspection. If casing is kinked, replace it.

1. Disconnect cable casing at speedometer head, then pull inner cable out of upper end of casing.

2. Inspect cable for worn spots or breaks. Check cable for kinks by holding one end vertically in each hand and turning cable slowly; if cable is kinked, the loop will "flop". Replace a cable which has kinks or bent tips.

3. Before installing a new inner cable, work AC spec. 640 speedometer cable lubricant into the cable thoroughly, then wipe off all excess lubricant. Since the speedometer casing has a Delrin (plastic) liner, this lubricant is used as a rust preventive only.

4. If noise is still present, install a new speedometer cable assembly.

5. If this does not correct noise, have speedometer head checked by a UMS Service Station.

c. Trouble-Shooting Speedometer and and Ignition Key Buzzer

Since both circuits simply provide a separate ground for the same buzzer, trouble-shooting will involve both circuits. See Figure 120-43. Check ignition key buzzer circuit by turning the ignition key to the accessory position and opening the driver's door. Check speedometer buzzer by setting speedometer pointer to a low speed, raising rear wheels of car, and running car in drive until the speedometer speed comes up to the set buzzer speed.

1. Buzzer Will Not Operate on Either Circuit.

(a) Check clock operation. If no clock, check clock fuse. Replace fuse if necessary.

(b) Check buzzer operation by sticking a prod in blue wire terminal at buzzer and running a jumper to ground. If buzzer now operates, circuit is okay through buzzer and trouble must be in wire to speedometer and door jamb switch. If buzzer still does not operate, replace buzzer.

2. Speedometer Buzzer Operates - Ignition Key Buzzer Does Not Operate.

(a) Remove driver's door jamb switch. Ground two white wires (one of which grounds the ignition key buzzer circuit) with ignition key in accessory position. If buzzer now operates, replace door jamb switch.

(b) If buzzer still does not operate, drop ignition switch and place a jumper between the KEY + and KEY - terminals. If buzzer now operates, replace ignition switch.

3. Ignition Key Buzzer Operates - Speedometer Buzzer Does Not Operate.

(a) Disconnect blue wire from speedometer and run jumper to ground. If buzzer now operates, circuit is okay as far as speedometer and trouble is in speedometer or in cluster ground circuit.

(b) If cluster ground wire is disconnected, there will be a poor ground for the speedometer buzzer, panel illumination lamps and wiper motor. To check for adequate cluster ground, turn on panel lights full bright, then turn on wiper motor and note panel light brightness. If panel lights do not dim, cluster has an adequate ground and trouble in (a) above must be due to a defect in speedometer. A defective speedometer assembly must be sent to the nearest UMS Service Station for repairs.

4. Buzzer Operates Continously.

(a) Eliminate possibility of a continuous ground at door jamb switch by removing switch from door jamb.

(b) Eliminate possibility of a continuous ground in speedometer by disconnecting blue wire from speedometer.

(c) If neither (a) or (b) stops buzzer, blue wire must be pinched or accidentally grounded between buzzer and one of these units.

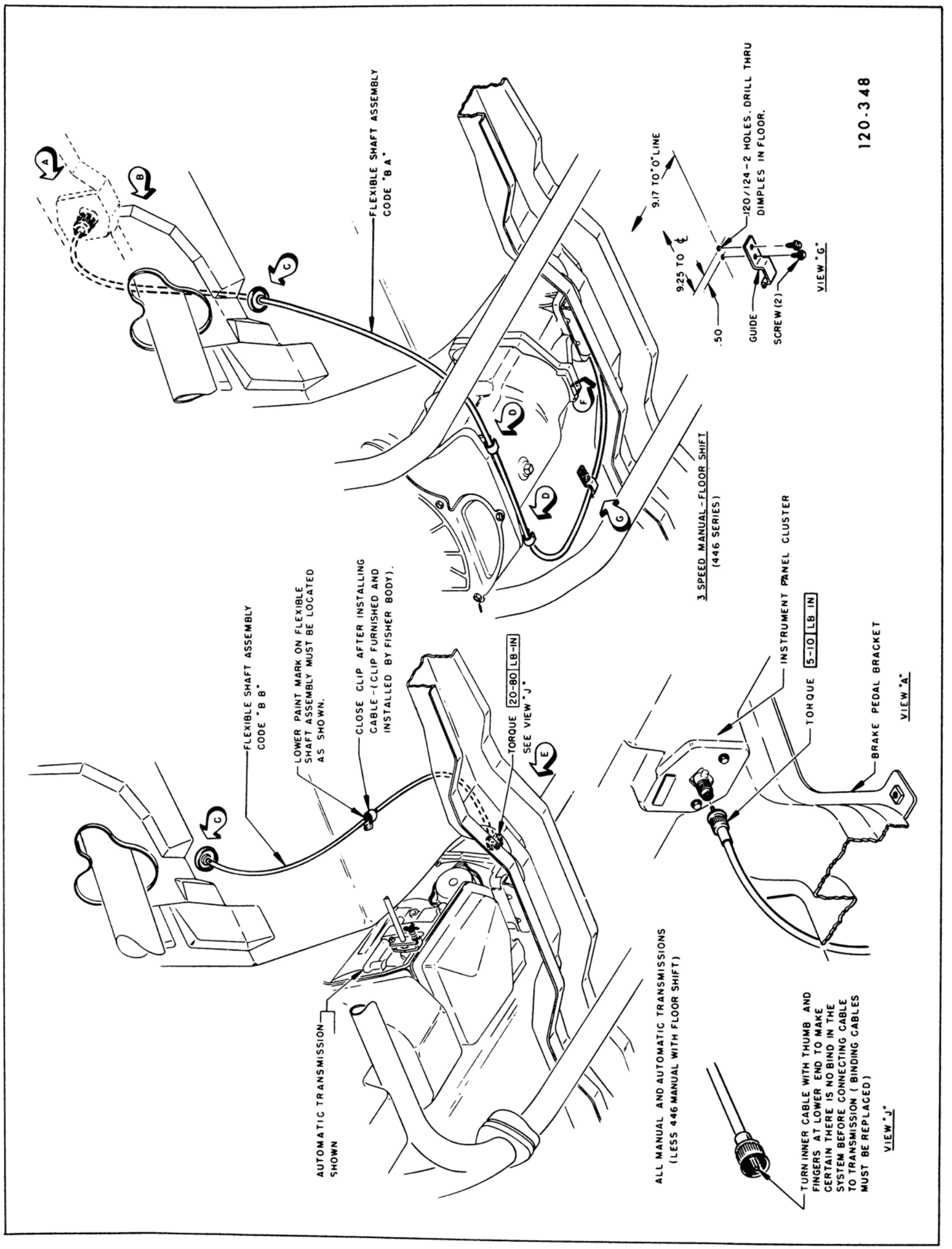

Figure 120-38—Speedometer Cable Installation 43-44000 Series Except 4-Speed Manual Transmission

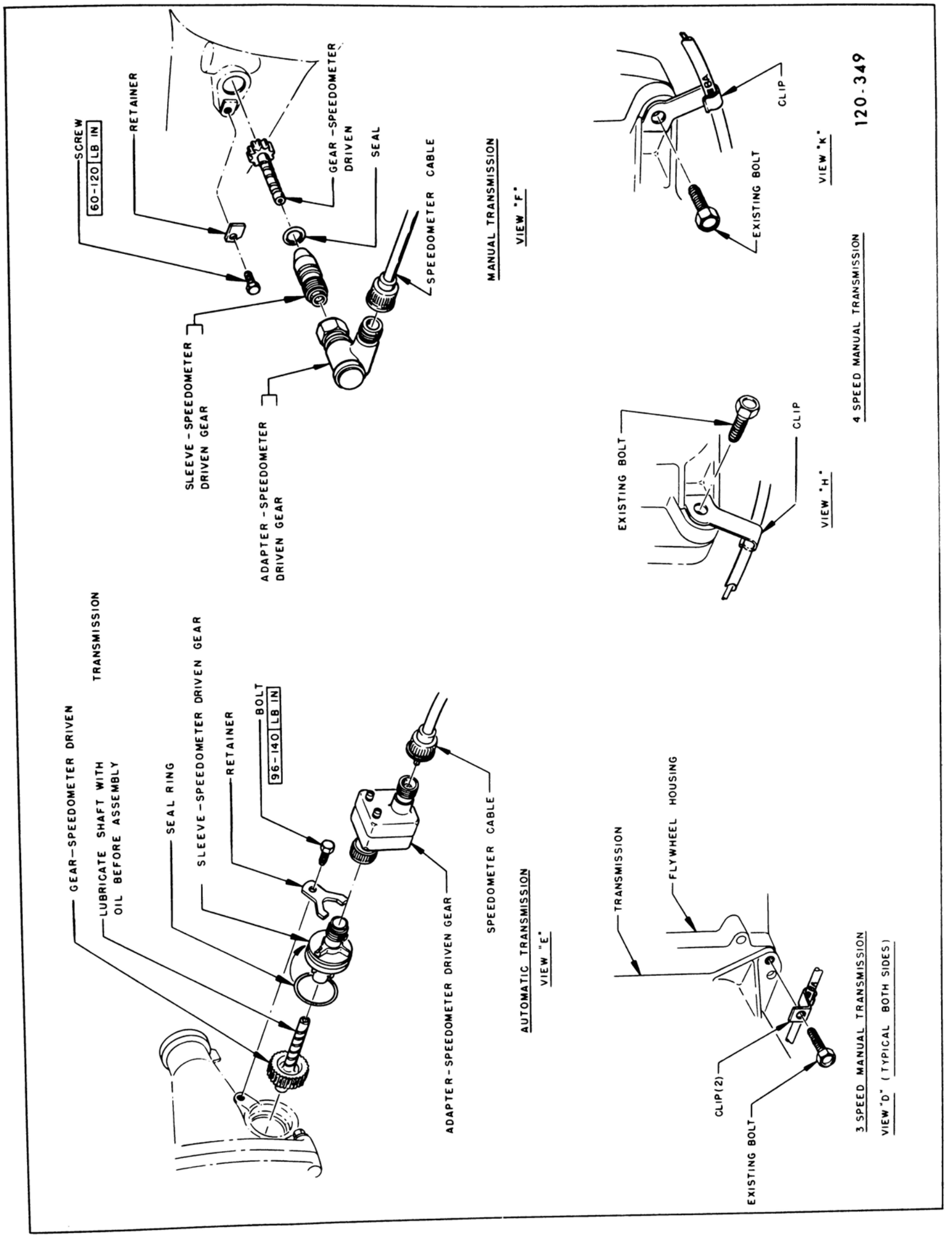

Figure 120-39—Speedometer Cable Installation 43-44000 Series

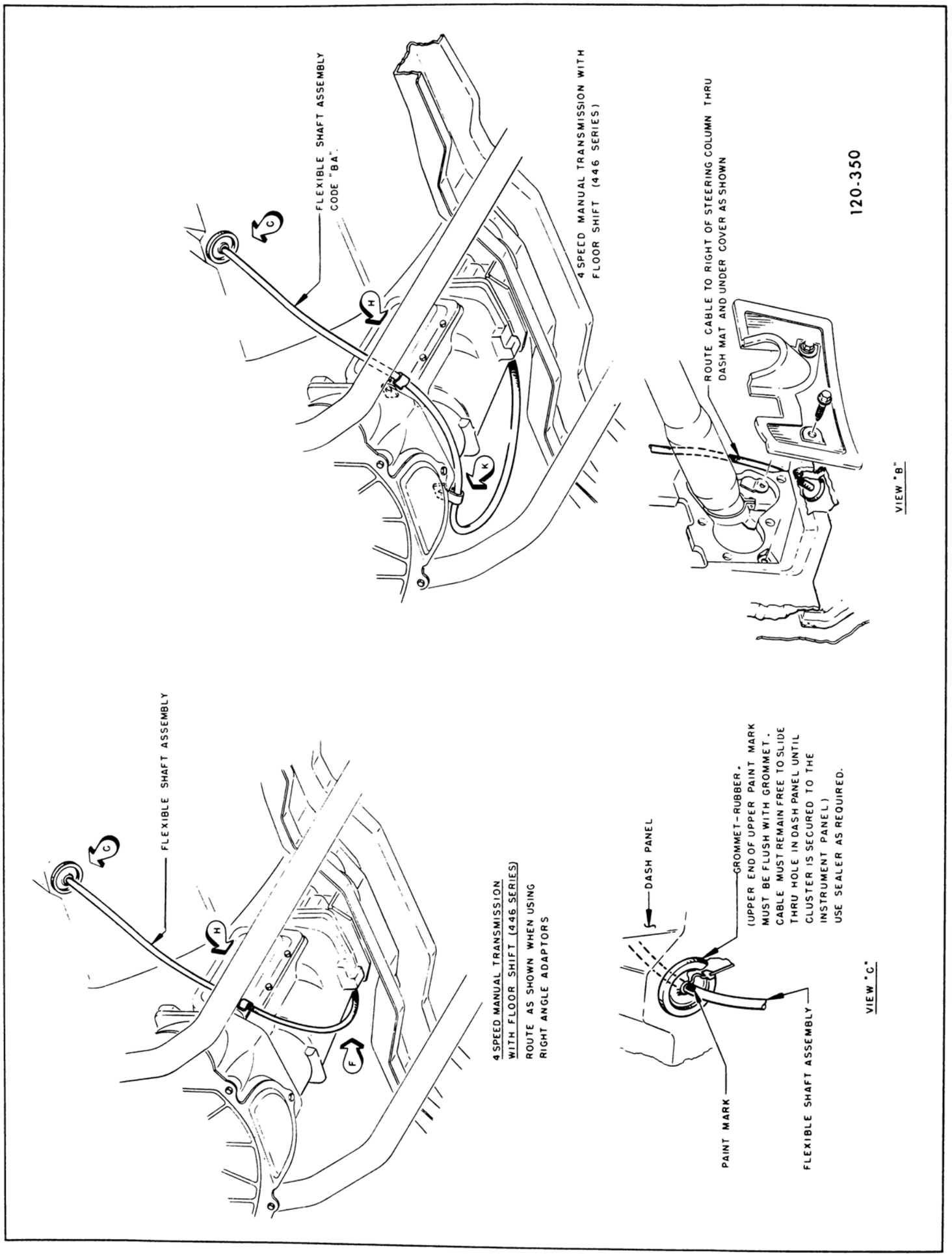

Figure 120-40—Speedometer Cable Installation - 4-Speed Manual Transmission

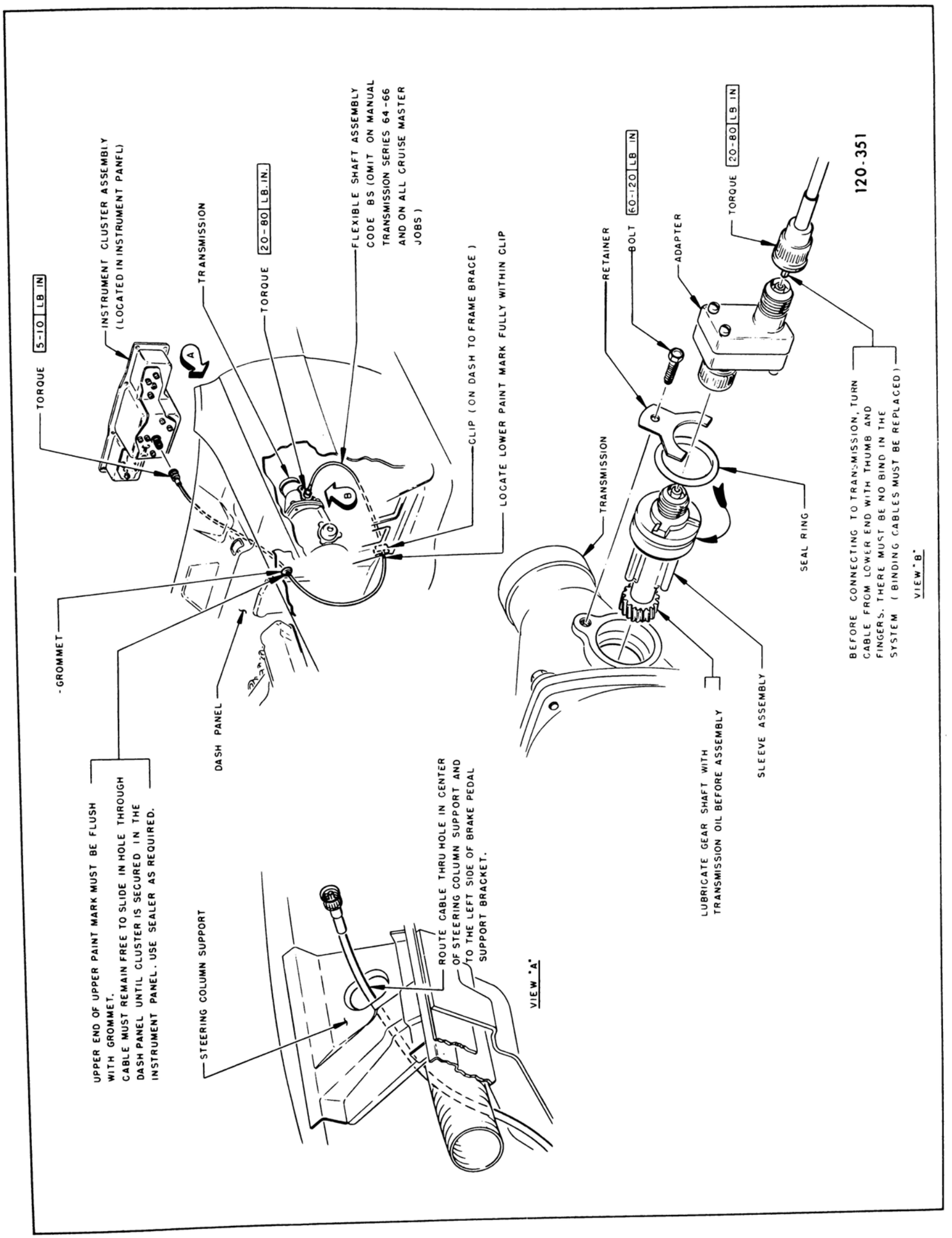

Figure 120-41—Speedometer Cable Installation - LeSabre, Wildcat and Electra

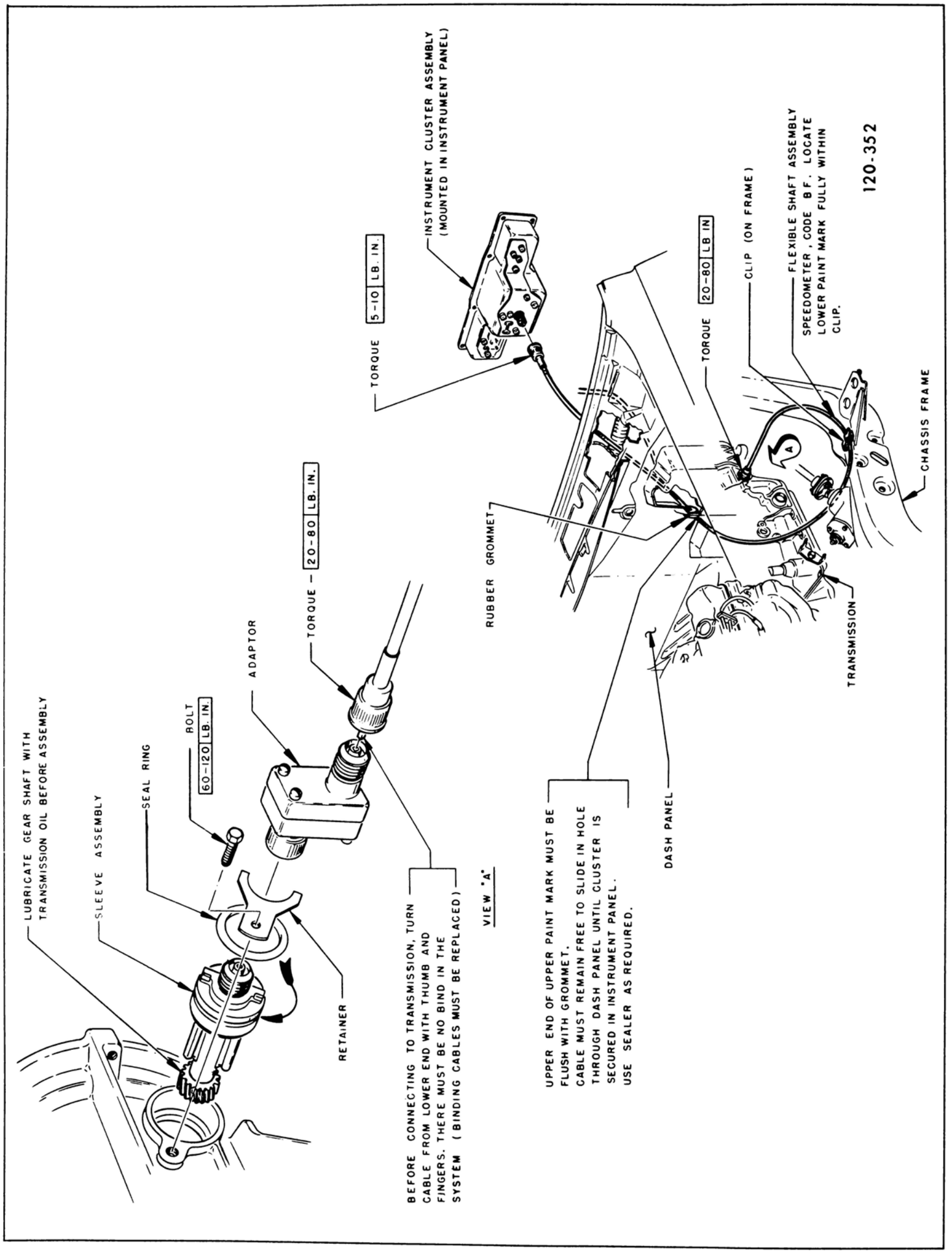

Figure 120-42—Speedometer Cable Installation - Riviera

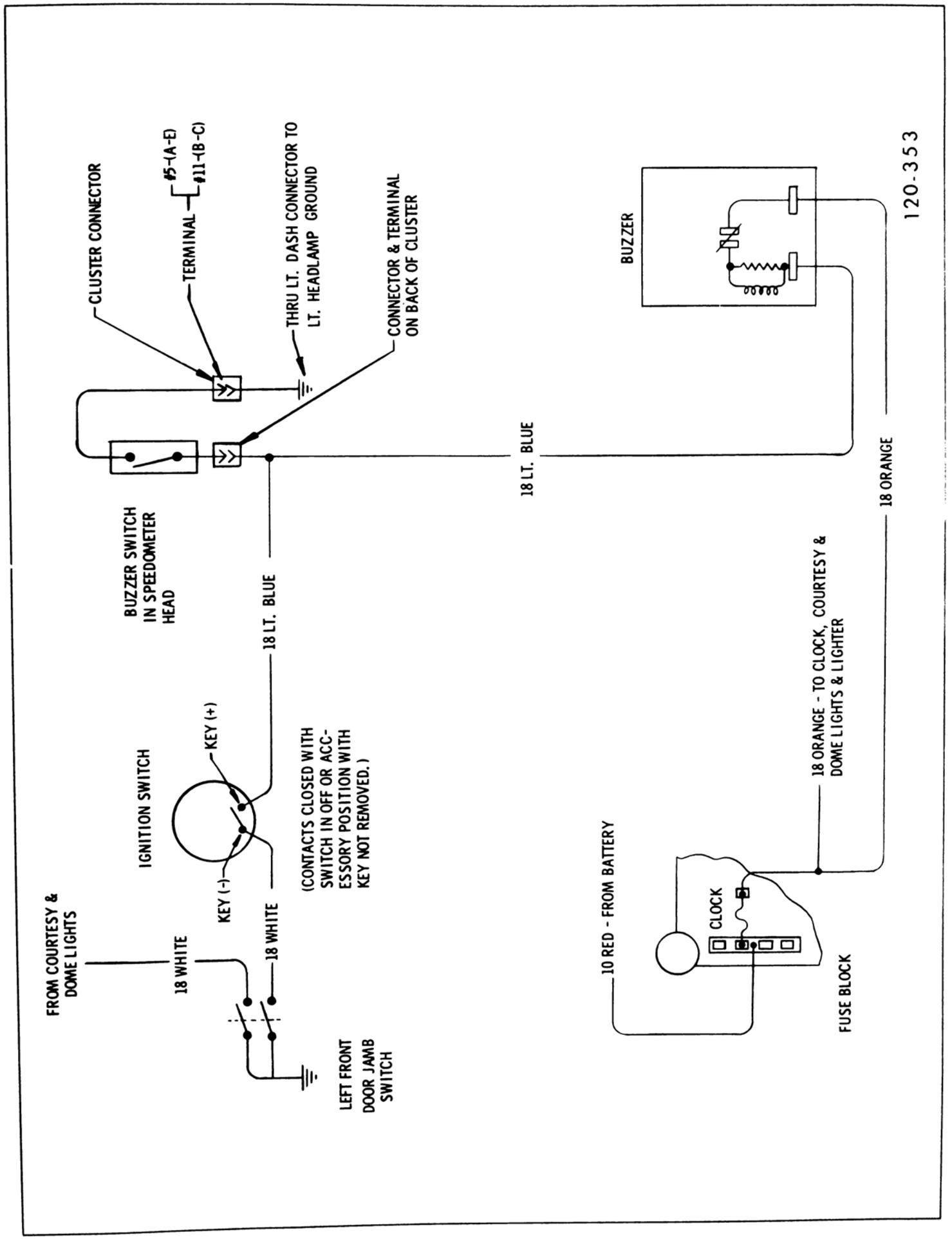

Figure 120-43—Speedometer and Ignition Key Buzzer Wiring Diagram