SECTION 10-I

INSTRUMENTS AND CLOCK

CONTENTS OF SECTION 10-I

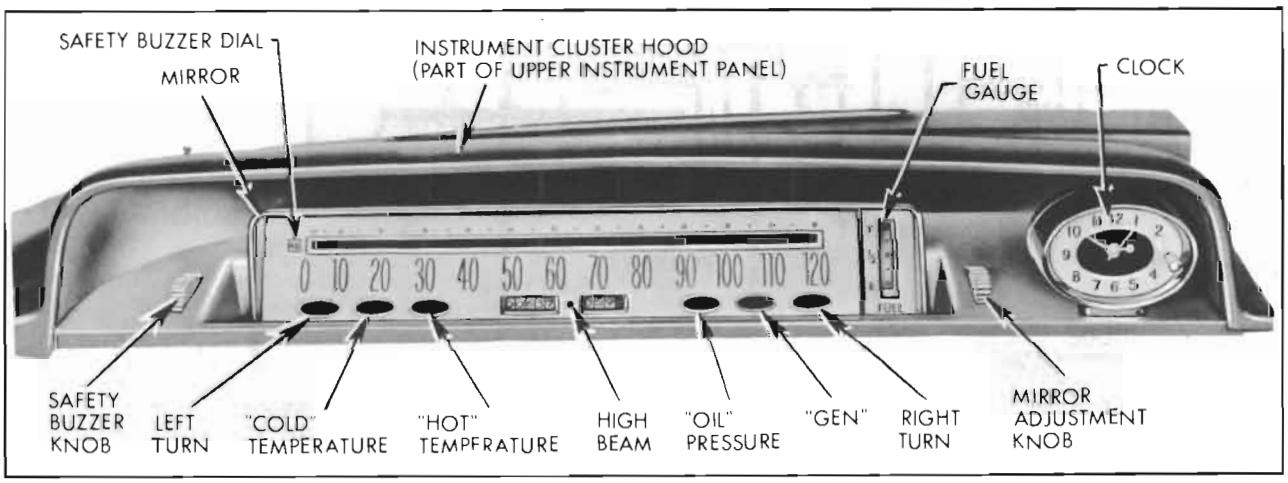
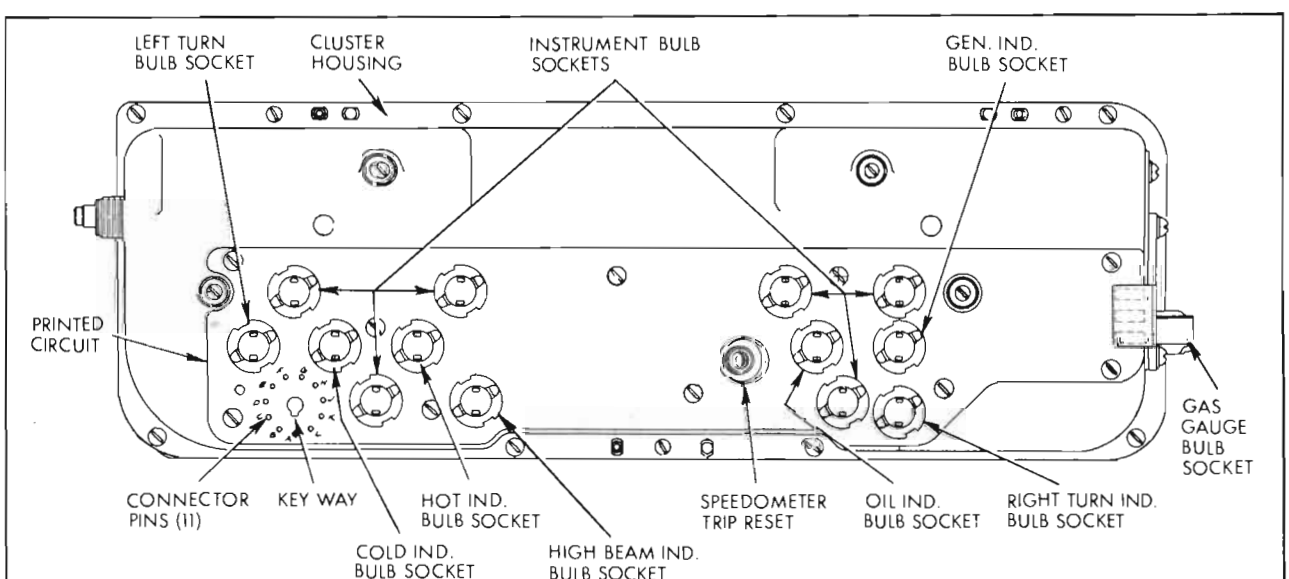


Figure 10-76—Instrument Cluster Assembly



LEGEND FOR CONNECTOR PINS AND CORRESPONDING WIRE COLOR IN DISCONNECT PLUG

A. To Right Turn Indicator—Orange
B. Gas Gauge Sender—Brown
C. Safety Buzzer Ground—Light Blue
D. To Left Turn Indicator—Tan
E. To Gas Gauge, Gen, Oil, Hot and Cold Indicators—Pink
F. Hot Indicator to Temperature Switch—Yellow
G. Cold Indicator to Temperature Switch—Dark Green with White Stripe
H. Oil Indicator to Oil Switch—Light Green
J. Gen Indicator to Generator—Red
K. To Instrument Lights—White
L. To High Beam Indicator—Gray

Figure 10-77—Instrument Cluster—Bottom View

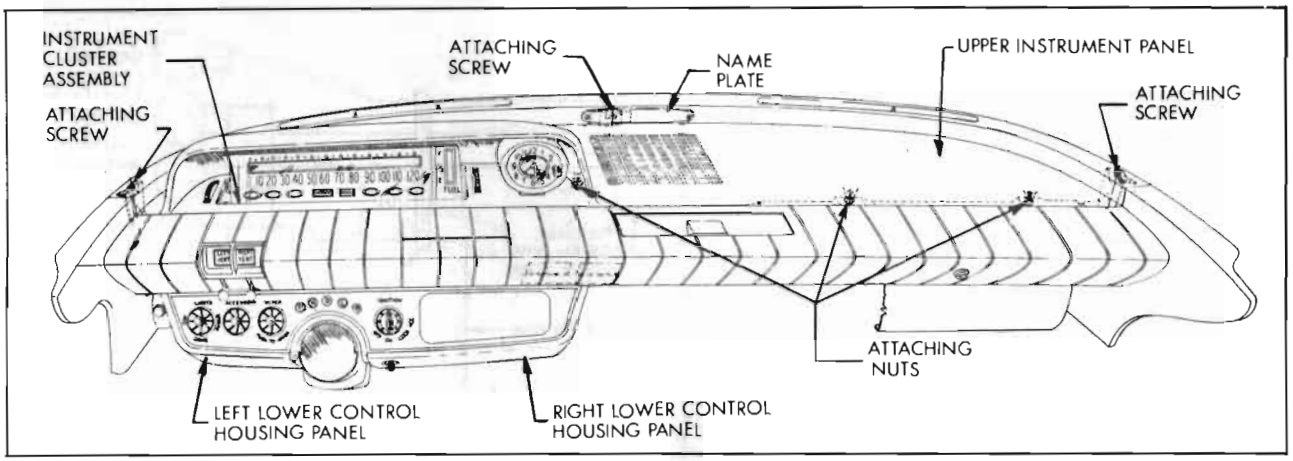


Figure 10-78—Upper Instrument Panel Installation

10-56 INSTRUMENT CLUSTER ASSEMBLY, GENERATOR INDICATOR, OIL PRESSURE INDICATOR, TEMPERATURE INDICATOR

CAUTION: *Disconnect battery ground strap before removing any instrument panel unit or wiring.*

a. Description of Instrument Cluster Assembly

The instruments in the cluster are read through a mirror which can be adjusted by the driver to the most readable position. See Figure 10-76. The generator, temperature and oil pressure indicators use lights to warn the driver of conditions other than normal when the engine is operating at speeds above idle.

A printed circuit is used to complete the circuits for all the lights and instruments in the cluster assembly. See Figure 10-77. A disconnect plug which is part of the instrument panel wiring harness attaches to the printed circuit connector pins. A key way is located in the printed circuit to insure correct assembly of the disconnect plug on the connector pins. If the printed circuit should become defective, it should be replaced as it is not practical to repair it.

It is necessary to remove cluster assembly to replace the printed circuit and the fuel gauge. The light bulb sockets are accessible by lowering either the right or left lower control housing and are removed from the printed circuit by turning bulb socket counterclockwise.

b. Removal and Installation of Instrument Cluster Assembly

1. Remove name plate located at front center of upper instrument panel. See Figure 10-78. Remove three screws located along front edge of upper instrument panel. Remove right lower control housing panel and remove nut located at right side of instrument cluster hood. Open glove box door and complete removal of upper instrument panel by removing the two nuts that attach it to upper tie bar and disconnecting radio speaker wire.

2. Remove left lower control housing panel and disconnect speedometer cable and instrument cluster disconnect plug. Care must be used when removing disconnect plug to prevent damage to connector pins.

3. Unplug clock connector from underside of clock. Remove clock or ornament and terminal

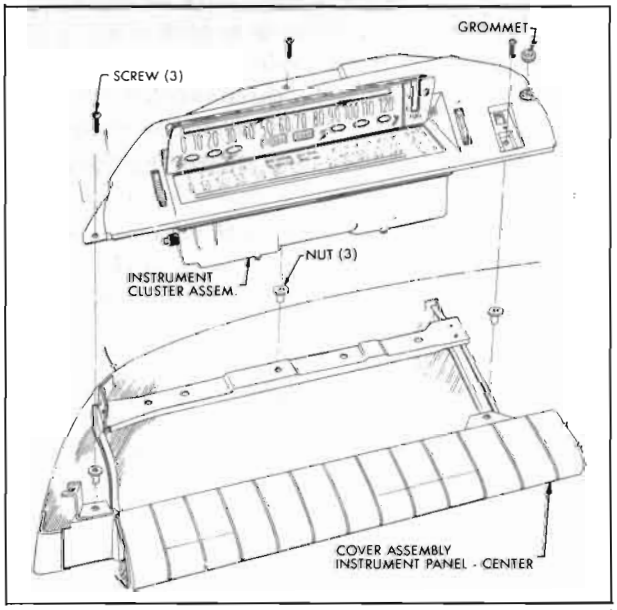


Figure 10-79—Instrument Cluster Assembly Installation

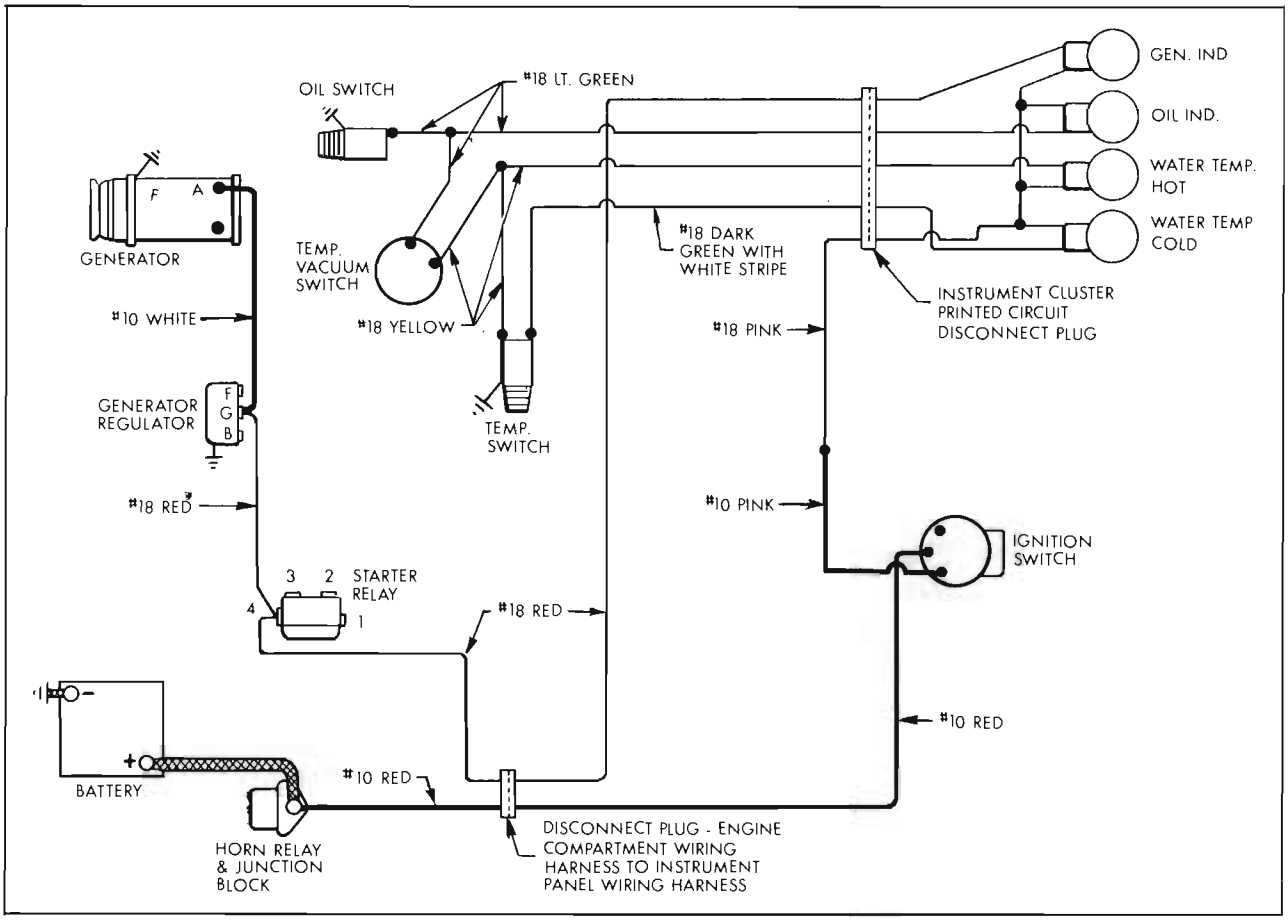


Figure 10-80—Indicator Light Circuits

block. See Figure 10-82. Remove three screws that attach cluster assembly to instrument panel, then remove assembly. See Figure 10-79.

NOTE: *On cars equipped with safety buzzer, the buzzer ground wire is attached to a connector pin located on underside of printed circuit. This wire must be disconnected from pin before removal of printed circuit is completed.*

4. Reinstall instrument cluster by reversing above steps.

NOTE: *The projection on the disconnect plug must be lined up with the key way in the printed circuit when assembling plug on connector pins.*

c. Generator Indicator

The red "Gen" warning light should light when the ignition is turned "on" and before the engine is started. If not lit, either the bulb is burned out or the wiring or generator circuit has an open circuit.

Battery voltage is supplied to the generator indicator light when ignition is "on." The ground for the light is through the armature of the generator. See Figure 10-80. Therefore, when the generator is not charging the "Gen" indicator will be lit. When the engine is running and generator output voltage at the light becomes as great as the battery voltage, the red "Gen" indicator will go out. The "Gen" indicator does not indicate whether the battery is being charged or discharged. If the light stays on *at engine speeds above idle* or if trouble is experienced with the battery or the charging system, the generator output should be tested as described in Par. 10-23.

d. Oil Pressure Indicator

The engine oil pressure indicator light is controlled by a pressure operated switch located in the main oil gallery at the right rear of the engine. See Figure 10-81. This light should come on when the ignition is turned "on" and the engine is not running. If not lit, either the bulb is burned out, the wiring has an open or the oil switch is defective.

If the engine oil pressure drops below a safe level during operation, the circuit is completed through the pressure switch to ground, and

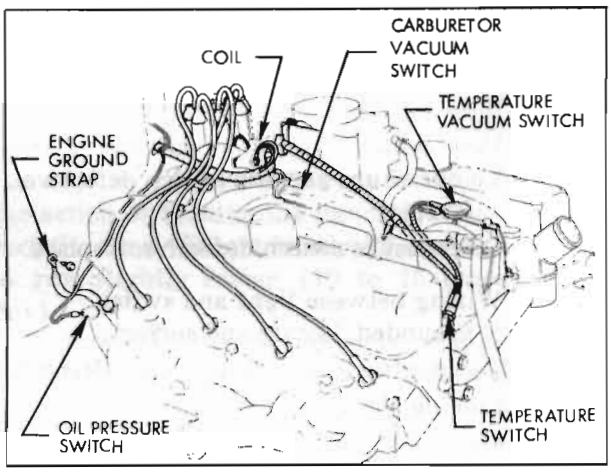


Figure 10-81—Oil Pressure, Temperature and Temperature Vacuum Switch Location

the "Oil" indicator light in the cluster will be turned on. See Figure 80.

If the "Oil" indicator stays on or comes on when the engine is running *at speeds above idle*, the following may be the cause, rather than low oil pressure:

1. Wiring circuit between oil pressure switch and light grounded. Remove connector from pressure switch, if light stays on trouble is in wiring.
2. Switch defective. Replace switch.

e. Temperature Indicator

A temperature switch located in right cylinder head controls the operation of a "Cold" temperature indicator with a green lens and a "Hot" temperature indicator with a red lens. See Figure 10-81.

When the cooling system water temperature is below 110 degrees F., the temperature switch grounds the "Cold" indicator circuit and the "Cold" on the instrument cluster is lit. When the "Cold" light goes out, the water temperature is high enough so that the heater can be turned on and be effective. *The car should never be subjected to full throttle accelerations or high speeds until after the "Cold" light has gone out.*

If the engine cooling system is not functioning properly and the water temperature should reach 248 degrees F., the "Hot" indicator will be turned on by the temperature switch. *As a test circuit to check whether the "Hot" indicator bulb is functioning properly, a vacuum switch is incorporated into its circuit.* See Figure 10-80. When the engine is not running, but the ignition is "On," the temperature vacuum switch completes a circuit from the "Hot" indicator to the "Oil" indicator. As there is no oil pressure, the "Hot" indicator light is grounded by the oil pressure switch and is lit. When the engine is started, the temperature vacuum switch opens this test circuit and the "Hot" indicator is then controlled by the temperature switch.

f. Trouble Diagnosis—Generator Indicator, Oil Pressure Indicator, Temperature Indicator

Use Figure 10-80 to trace wiring circuits for indicator lights and Figure 10-77 for location of indicator light bulb socket. To determine if there is a ground in the indicator light circuit, remove connector from control switch, if light stays on, trouble is in circuit.

Complaint		Possible Cause
1. Generator Indicator	Light not lit, ignition "On" and engine not running.	Bulb burned out. Replace. Open in light circuit. Locate and correct.
	Light on, engine running above idle speed.	No generator output. Check output, Par. 10-23.
2. Oil Pressure Indicator	Light not lit, ignition "On" and engine not running.	Bulb burned out. Replace. Open in light circuit. Locate and correct. Oil pressure switch defective. Replace.
	Light on, engine running above idle speed.	Wiring between light and switch grounded. Locate and correct. Oil pressure switch defective. Replace Low oil pressure. Locate cause and correct.

	Complaint	Possible Cause
3. Temperature Indicator Hot Indicator	Light not lit, ignition "On" and engine not running.	Bulb burned out. Replace. Open in light circuit. Locate and correct. Temperature vacuum switch defective. Replace. Oil pressure switch defective. Replace.
	Light on, engine running.	Wiring between light and switch grounded. Locate and correct. Temperature switch defective. Replace. Cooling system water temperature above 248°F. Find cause and correct.
Cold Indicator	Light not lit, ignition "On" and engine cold.	Bulb burned out. Replace. Open in light circuit. Locate and correct. Water temperature switch defective. Replace.
	Light on, after normal engine warm-up period.	Wiring between light and switch grounded. Locate and correct. Water temperature switch defective. Replace. Thermostat in cooling system defective. Replace.

10-57 ELECTRIC CLOCK

The electric clock is mounted on the right end of the instrument cluster. The clock wiring circuit is protected by the "CLOCK" fuse on the fuse block. The clock light is controlled by the rheostat in the lighting switch and is protected by the "INST. LTS." fuse on the fuse block.

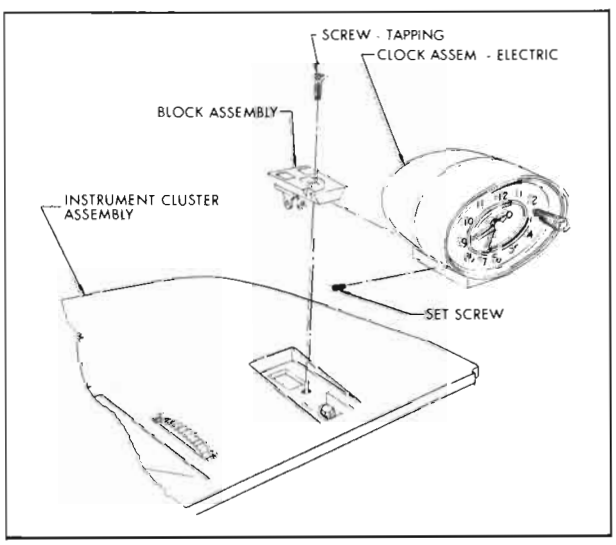


Figure 10-82—Electric Clock Installation

If burned out, this bulb is accessible by removing the clock. The clock is retained to its terminal block by an Allen set screw. See Figure 10-82.

a. Clock Time Reset and Automatic Regulation

The electric clock incorporates a sweep-second hand and an automatic regulator. A reset knob extends through the glass on right side of the clock dial. To reset the time, pull the knob out and turn in either direction as required. See Figure 10-83.

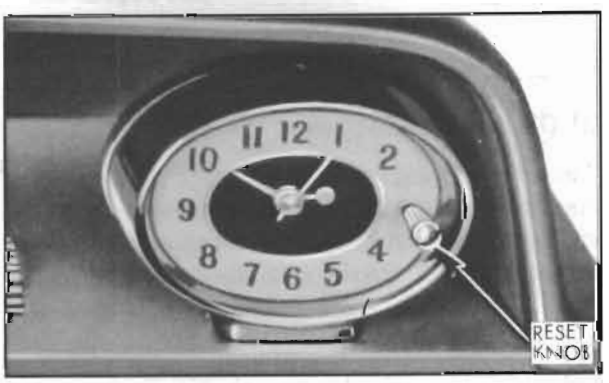


Figure 10-83—Electric Clock Reset Knob

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 15 seconds per day).

A lock-out feature prevents the regulator mechanism from being moved more than once in a 15 minute period, regardless of the number of times the clock reset is operated. After 15 minutes if the clock is again reset, automatic regulation will take place.

b. Winding Clock When Connecting Clock Wiring or Battery

The electric clock requires special attention when reconnecting a battery that has been disconnected for any reason, a clock that has been disconnected, or when replacing a blown clock fuse. IT IS VERY IMPORTANT THAT THE INITIAL WIND BE FULLY MADE. To be certain of this, reconnect battery cables as follows:

1. Make sure that all other instruments and lights are off.

2. Connect one cable (preferable positive) to battery.

3. Before connecting the *last* cable to battery, press the terminal to its post on battery. Immediately afterward strike the terminal against battery post to see if there is a spark. If there is, allow the clock to run down until it stops ticking, and repeat as above until there is no spark. Then immediately make the permanent connection before the clock can again run down. The clock will run down in approximately 2 minutes.

4. Reset clock after all connections are made.

NOTE: *The above procedure should also be followed when reconnecting the clock after it has been disconnected, or if it has stopped because of a blown fuse. Be sure to disconnect battery cable before installing a new fuse.*

c. 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.*

10-58 GASOLINE GAUGE—DASH AND TANK UNITS

The gasoline gauge consists of two units; the dash unit located in the instrument cluster, and the tank unit located in the gasoline tank. One terminal of the dash unit is connected to the ignition switch so that the unit registers only when the ignition switch is turned on.

With the ignition turned off, the pointer may register any place on the dial of gauge. The other terminal of the dash unit is connected by a single wire to the tank unit, which is grounded on the tank to complete the circuit.

The dash unit pointer is moved by changing the magnetic pull of two coils in the unit. The magnetic pull is controlled by action of the tank unit which contains a variable rheostat, the value of which varies with movement of a float and arm. The tank unit is mounted in the tank so that the float rises and falls on the surface of the gasoline near the middle of the tank. The float is adjusted to provide approximately 1 gallon reserve when the dash unit pointer is at the dot next to the "E" position.

If the gasoline gauge does not operate properly, the dash unit, tank unit wiring and tank unit should be separately tested to determine which is at fault. The units and wiring may be tested by using a known good tank unit with a 12 foot piece of red insulated (#16) wire attached to binding post of unit and a similar 5 foot piece of black wire attached to flange of unit. Attach a spring clip to end of black wire and a terminal to end of red wire.

a. Test of Dash Unit and Tank Unit Wiring

1. Disconnect the tank unit (brown) wire at connector under rear floor of luggage compartment. This connector is retained to the upper section of the rear frame cross member by a clip. Plug the red test wire terminal into the connector and attach the black test wire to any convenient ground on the car.

2. Turn ignition switch on and move arm of test unit up and down against the stops while observing dash unit. If dash unit and wiring

are okay, dash unit pointer will move freely from "Empty" to "Full" with movement of tester arm, indicating that trouble is in tank unit or the short wire leading to it.

b. Test of Dash Unit

1. Disconnect the tank unit at connector under rear floor of luggage compartment. Remove left lower control housing panel. Attach the test unit black wire to ground.

2. Turn ignition on. Then with terminal of red test wire contacting the dash unit to tank unit circuit (rearmost circuit) on printed circuit, move arm of test unit up and down against the stops. See Figure 10-84. If dash unit is okay, the pointer will move freely from "Empty" to "Full" with movement of tester arm, indicating that trouble is in wiring. If pointer does not move or only moves part way, the printed circuit may be defective or the unit is faulty and should be replaced.

CAUTION: *If the wrong circuit is contacted on printed circuit, the rheostat in test unit may be damaged.*

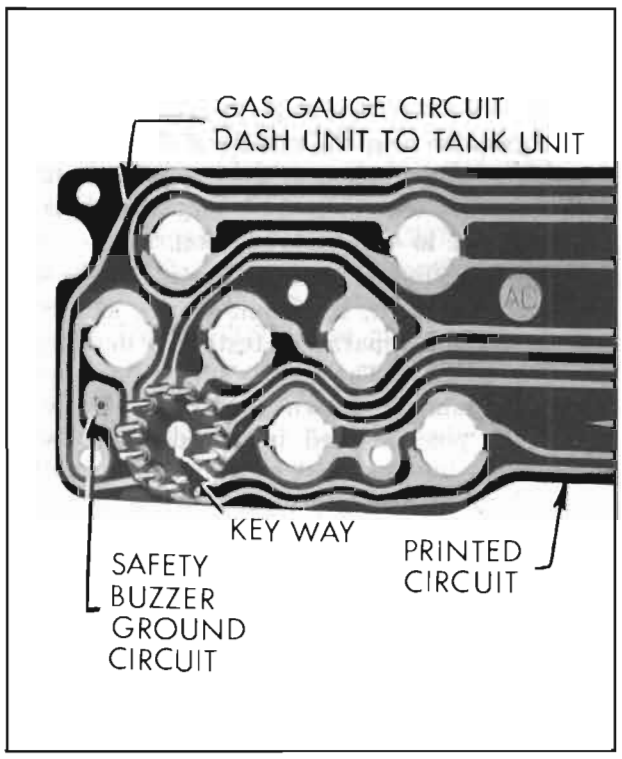


Figure 10-84—Printed Circuit—Left Side

3. If, on the test of dash unit and tank unit wiring, (sub par. a) dash unit reads "Empty" or noticeably low at all times, look for a ground in the wiring circuit between dash unit and connector. If dash unit reads above "Full" or noticeably high at all times during test, look for points of high resistance or open circuit in wiring.

c. Test of Tank Unit

1. If tests given above indicate that the trouble is in the tank unit, remove the gasoline tank so that the tank unit may be cleaned and tested.

2. Before removing unit from gasoline tank clean away all dirt that has collected around the tank unit, and note whether the insulation was in proper position over the terminal and wire. Road dirt, particularly calcium chloride, may have caused an electrical leak that threw the tank unit out of calibration.

3. After thorough cleaning and removal of tank unit, connect it to ground and to wire leading to dash unit, and test in the same manner as when using tester. If tank unit tests okay it should be reinstalled in tank, otherwise it should be replaced with a new unit. When installing tank unit make certain that insulation is folded over the terminal and snapped over wire.

10-59 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. See paragraph 4-7 for gear ratios.

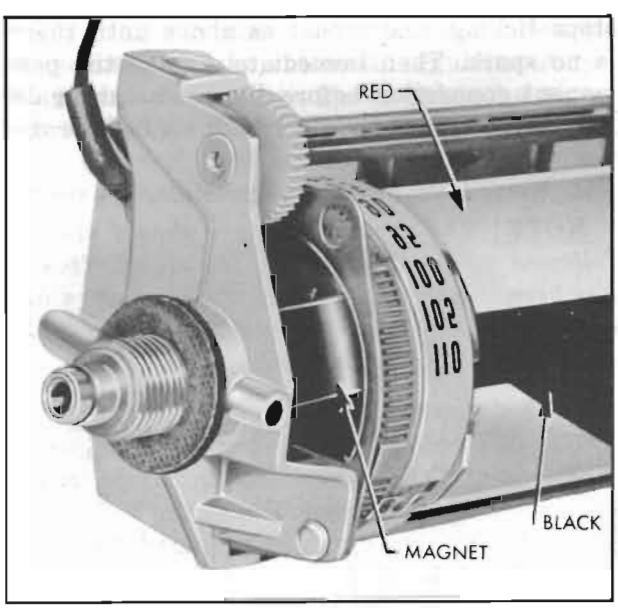


Figure 10-85—Drum Type Speedometer

The speedometer head has a long drum painted half red and half black on the diagonal so that as the drum revolves a red line moves horizontally across the dial face. See figure 10-85.

All speedometer heads are provided with a trip odometer and reset knob. Pushing the reset knob up and turning clockwise gives a quick reset; turning knob counterclockwise resets 1/10 mile at a time.

b. Checking Noisy Speedometer

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

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 neutral or parking position, then run engine through same speed range as before.

4. If the noise continued in step 3, something other than the speedometer installation is at fault. If noise disappeared, inspect and lubricate speedometer cable (subpar. *c*). If this does not correct the noise, have speedometer head checked by a UMS Service Station.

c. Inspection and Lubrication of Speedometer Cable

If the speedometer installation appears to be noisy or the speed indicator wavers, inspect the cable casing for damage, sharp bends, or for being out of the supporting clips. If casing is in good condition and properly installed, remove cable for inspection and lubrication.

1. Disconnect speedometer cable casing at the speedometer head, then pull cable out of upper end of casing. It is necessary to remove instrument cluster assembly to remove cable (Par. 10-55).

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 kinked cable.

3. Coat the lower two thirds of the cable with AC type ST-640 speedometer cable lubricant. If this is not available, No. 110 Lubriplate may be used. As cable is inserted into casing from upper end the lubricant will spread over its entire length.

4. When cable is connected to speedometer head make sure that the felt dampener washer is in place over the cable collar and that the cable tip seats properly in the head socket.

d. Trouble-Shooting Speedometer Safety-Buzzer

The safety-buzzer is standard equipment on Series 4800 and is a factory installed option on all other series. This feature consists of a buzzer which may be adjusted by the driver to sound at any speed between 20 and 110 MPH by turning a knob on the left side of instrument cluster. See Figure 10-76. The speed at which the safety-buzzer is set is indicated by a dial at the left side of the speedometer face.

The safety-buzzer electrical circuit starts at a 5 ampere fuse marked "BK & BZ" located on the fuse block. Since this fuse also protects the parking brake warning light, a functioning warning light indicates that this fuse is OK. See Figures 10-86 and 10-90. This circuit is "hot" whenever the ignition switch is turned on. From the fuse, a dark green wire carries the current to a buzzer mounted on a bracket that is attached to the left side of the lower instrument panel tie bar. 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 printed circuit located on the speedometer case. See Figure 10-86.

In the speedometer, current is conducted to an insulated ring which has a dial reading from 20 to 110. A grounding brush projects from this insulated figure ring in such a position that a grounded plate on the speedometer cylinder will contact it as the cylinder rotates, thereby grounding the circuit and causing the buzzer to operate.

The insulated ring with its dial and grounding brush can be rotated by turning the reset knob while observing the dial through a small window at the left side of the speedometer. The car will then have to be moving at the rate of speed indicated on this dial before the speedometer cylinder will rotate far enough for its grounded plate to contact the brush.

1. Buzzer Will Not Operate or Operates Intermittently

(a) Turn ignition switch on.

(b) To check buzzer circuit up to connection to printed circuit, stick a prod in terminal at buzzer connector with the light blue wire and run jumper to ground. If buzzer now operates, circuit is OK through buzzer and trouble must

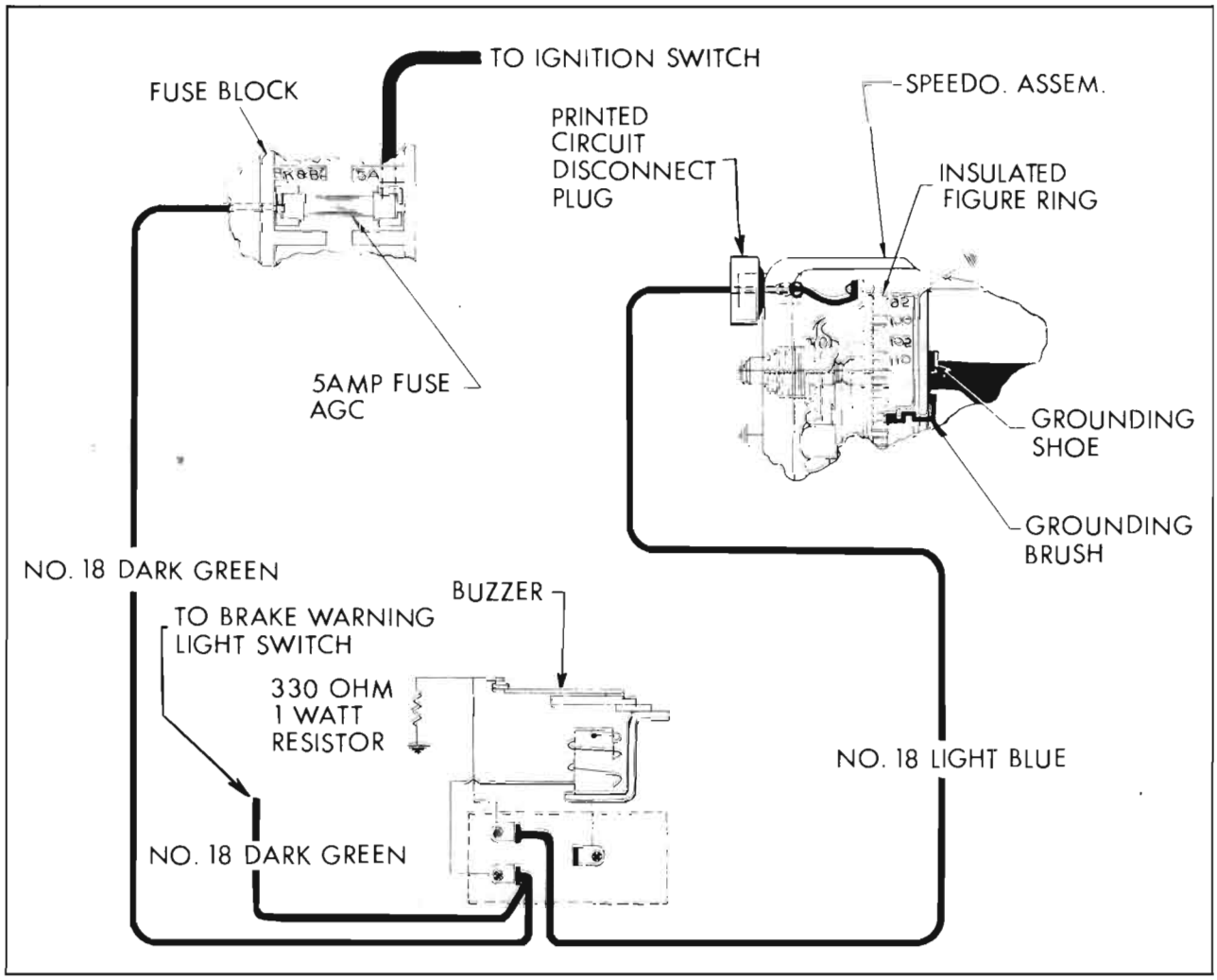


Figure 10-86—Safety-Buzzer Circuit Diagram

be in wire to printed circuit, in printed circuit or in speedometer. To check buzzer circuit up to printed circuit, contact buzzer circuit on printed circuit with one end of a wire while grounding the other end. See Figure 10-84. If buzzer operates, buzzer ground wire may not be attached to its pin on printed circuit or trouble is in speedometer.

(c) If buzzer did *not* operate when buzzer connector was grounded (in step b), trouble may be in buzzer circuit. Check "BK & BZ" fuse on fuse block and replace 5 ampere fuse if necessary.

NOTE: *Since this fuse also protects the parking brake warning light, a functioning warning light indicates that this fuse is OK.*

(d) Check buzzer circuit wiring connectors at fuse block and at buzzer. See Figure 10-86.

(e) Next eliminate buzzer as source of trouble by unplugging connector at buzzer. Then plug a known good buzzer onto the connector.

2. Buzzer Operates Continuously

(a) Check light blue wire from buzzer to speedometer for ground.

(b) Remove printed circuit disconnect plug. If buzzer stops, circuit is grounded inside speedometer and speedometer must be removed for repair. If buzzer still operates, however, buzzer unit is defective and must be replaced.

3. Speedometer Defective

A defective speedometer assembly must be sent to the nearest UMS Service Station for repairs.