

# I N S T R U M E N T

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## COMBINATION METER

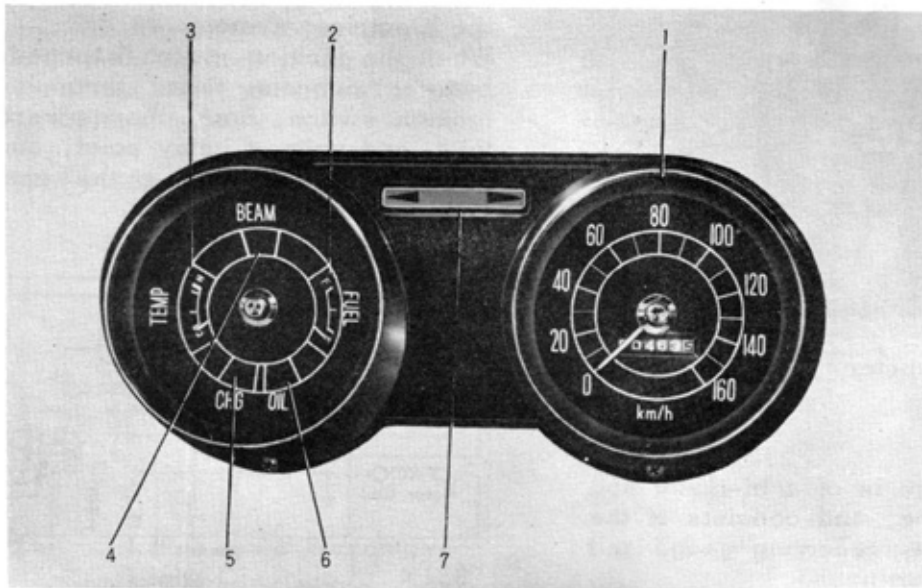


Fig. 2-1 Combination Meter

V0515

Description

The combination meter consists of the speedometer(1), fuel gauge(2), water temperature gauge(3), high beam indicator light(4), charge warning light(5), oil pressure warning light(6) and turn signal indicator light(7).

Speedometer

The speedometer is a rotating magnet type. The rotor encloses the magnet with a hair spring attached to the center point. A permanent magnet is installed on the magnet shaft which is driven by the speedometer cable

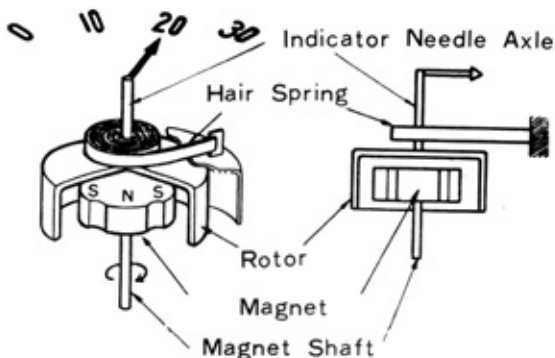


Fig. 2-2 Speedometer Operation Diagram X1884

connected at the end of the transmission housing.

This permanent magnet rotates in relation with the revolution of the speedometer cable, and the rotor will revolve by the magnetic force counter-acting the hair spring tension.

To the rotor a needle is provided to indicate the various speeds of the car. When the magnet shaft rotates 637 rpm it will indicate the speed of 60 km/h or 40 m/h on the speedometer dial.

Odometer

The odometer transmits the rotation of the magnet shaft to the horizontal gear(1), vertical gear(2), counter gear and integrating ring(3) in order, and will integrate 1 kilometer or 0.6 mile when the magnet shaft rotates 637 rpm.

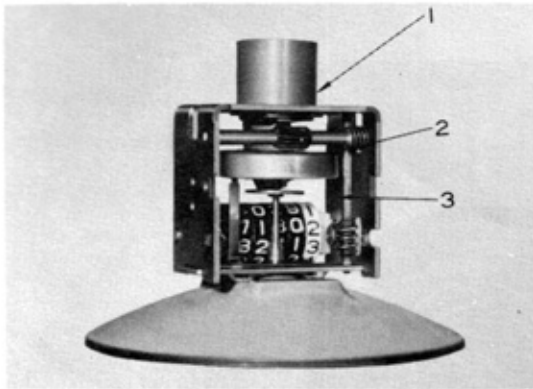


Fig.2-3 Odometer V0516

Fuel Gauge

The fuel gauge is of a bi-metal and resistance type, and consists of the sending gauge, receiving gauge and voltage regulator.

The current passing through the receiving gauge heating coil varies in inverse proportion to the resistance which varies by the movement of the float.

By this current the heating coil is energized and the actuated heat is applied onto the bi-metal.

The bending of the bi-metal will register the fuel quantity in the fuel tank.

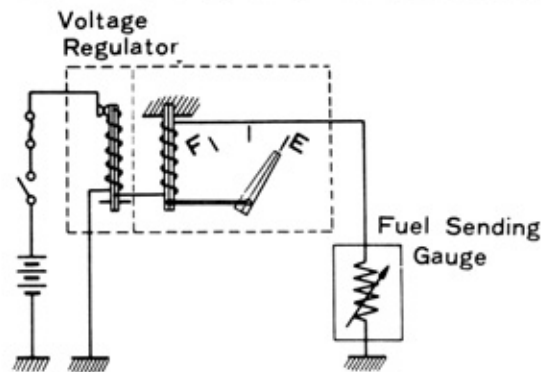


Fig.2-4 Fuel Gauge Operation X4891

Also the voltage regulator is incorporated between the battery and the receiving gauge to keep the battery voltage constant.

Charge Warning Light

The charge warning light glows when-

ever the ignition switch is at ignition position with no current supplying to the electrical system.

When the ignition switch is turned on, battery current flows through the ignition switch, fuse, charge warning light and voltage relay point, and is grounded. Therefore, the charge warning light comes on.

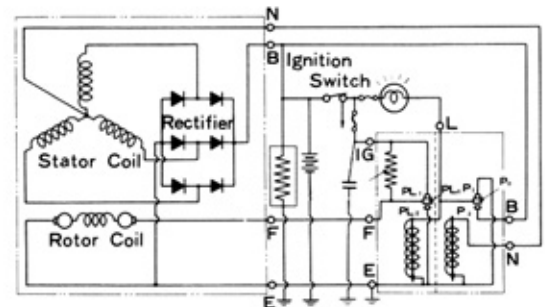


Fig.2-5 Charge Warning Light Coming On Y2094

When the engine starts, the alternator builds up enough voltage to close the voltage relay point to the "B" side, and the charge warning light goes out.

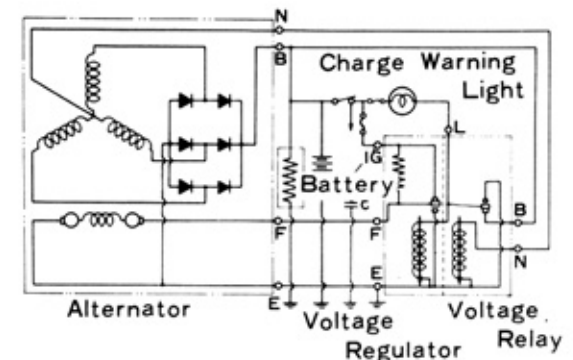


Fig.2-6 Charge Warning Light Going Out Y2095

Oil Pressure Warning Light

The oil pressure switch is located at the outlet of the oil cleaner.

Oil pressure more than 0.2 to 0.4 kg/cm<sup>2</sup> raises the diaphragm in the oil pressure switch to open the contact point and the oil warning light is turned off.

When the oil pressure drops below the proper operating value the diaphragm will lower to close the point, then will turn on the oil warning light to warn the low pressure in the engine lubricating system.

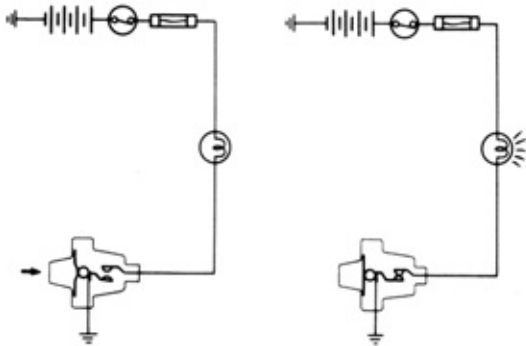


Fig. 2-7 Oil Pressure Warning Light Diagram X1887

Water Temperature Gauge

The water temperature gauge is of a bi-metal and resistance type, and consists of the sending gauge, receiving gauge and voltage regulator. The thermistor whose resistance varies as illustrated in the figure 2-8 with the temperature is used in the sending gauge.

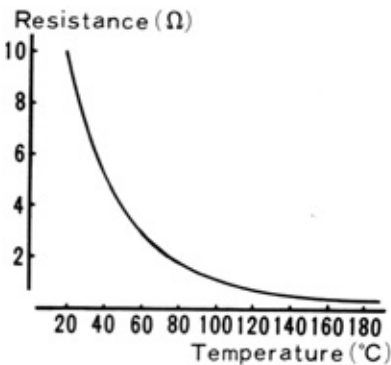


Fig. 2-8 Thermistor Temperature-Resistance Diagram X4893

The operation of this gauge is similar to the fuel gauge.

At low temperature, as the resistance in the thermistor is large, the current flowing through the receiving gauge heating coil is small and the bi-metal will bend considerably to indicate the low reading.

When the water temperature is high, the resistance in the thermistor is small, therefore, the current flowing through the receiving heating coil is large and the bi-metal will bend to indicate the high reading.

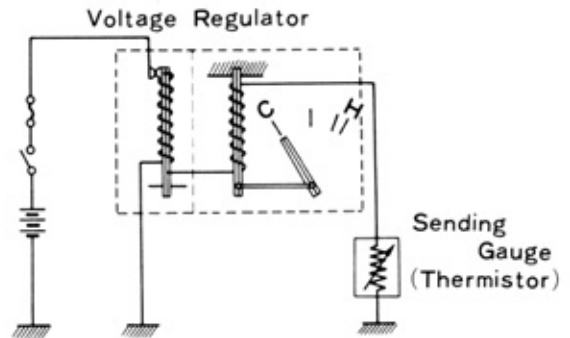


Fig. 2-9 Water Temperature Gauge Diagram X4894

Turn Signal Indicator Light

The turn signal indicator light is connected in parallel with the front and rear turn signal lights, and the flasher circuit is illustrated in the figure 2-10.

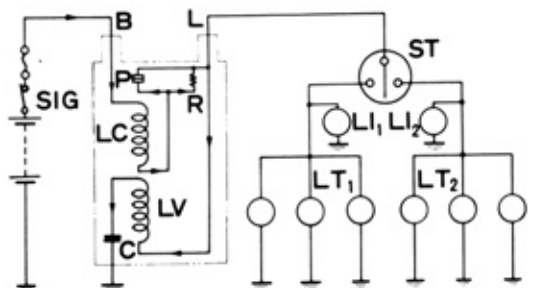


Fig. 2-10 Flasher Circuit X3769

Whenever the ignition switch SIG is turned ON, current flows through the voltage coil LV to the condenser C from the battery, and the condenser is in the charged condition.

When the turn signal switch ST is turned to the LT<sub>1</sub> side of the turn signal light, current flows through the current coil LC in the flasher to the turn signal light LT<sub>1</sub> and indicator light LI<sub>1</sub>, and the lights come on.

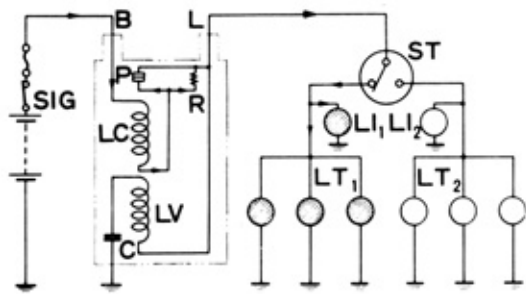


Fig.2-11 Switch ST "ON" X3770

As the current flows in the coil LC, the coil LC pulls the point P, and the lights go out. At the same time, the condenser starts discharging and by the coil LV attractive force, the point will be kept opened until the condenser finishes discharging.

In this case, both the discharging current and current passing through the resistance R flow into the lights, but they are too small to operate the light.

When discharging current becomes small and attractive force of the coil becomes weak, the point closes by its spring force, and current flows through the coil LC and LV.

The current flowing through them are in the opposite direction to each another, therefore, the magnetic force neglect each another, any force which pulls the point does not operates, and the lights are on continuously.

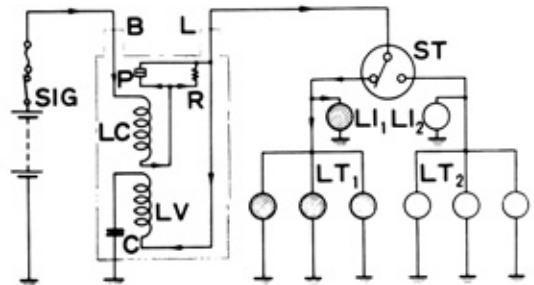


Fig.2-13 Point Closes X3772

When the condenser is charged almost fully, the current flowing through the coil LV decreases, and the attracting force of the coil LC becomes larger than that of the coil LV and pulls the point, then the lights go out. The above operation is repeated to cause the lights to flash.

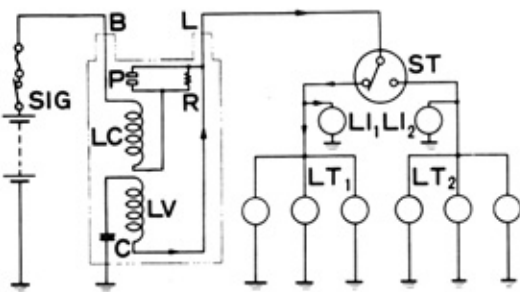


Fig.2-12 Point Opens X3771

Trouble Shooting

Symptoms & Probable Causes	Remedies
<b>Speedometer</b>	
1. Incorrect indicating	
a. Drive gear damaged	Replace
b. Driven gear damaged	Replace
c. Drive cable defective	Replace
d. Speedometer defective	Repair or replace
2. Incorrect integrating	
a. Counter gear wrongly meshed	Replace
b. Gears worn or damaged	Replace

- |                               |                     |
|-------------------------------|---------------------|
| 3. Noise                      |                     |
| a. Insufficient oil or grease | Apply oil or grease |
| b. Drive cable defective      | Repair or replace   |
| c. Shafts worn                | Replace             |

Fuel Gauge

- |   |                         |
|---|-------------------------|
| 1. Incorrect indicating   |                         |
| a. Terminal insufficiently contacted                            | Repair                  |
| b. Receiving gauge defective                                    |                         |
| (1) Incorrect adjustment  | Adjust                  |
| (2) Point burned out  | Replace                 |
| (3) Bi-metal deformed   | Replace                 |
| c. Sending gauge float not operating smoothly                   | Repair or replace       |
| 2. No indicating  |                         |
| a. Broken wire in the circuit                                   | Repair                  |
| b. Indicator needle defective                                   | Repair or replace       |
| c. Receiving gauge defective                                    |                         |
| (1) Heating coil broken   | Replace receiving gauge |
| (2) Regulator point broken                                      | Replace receiving gauge |
| (3) Bi-metal deformed   | Replace receiving gauge |
| d. Sending gauge resistance broken                              | Replace                 |
| 3. Indicator needle registers beyond limit                      |                         |
| a. Broken or shorted wire from sending gauge to receiving gauge | Repair                  |
| b. Receiving gauge defective                                    |                         |
| (1) Heating coil broken   | Replace receiving gauge |
| (2) Bi-metal poor grounded                                      | Replace receiving gauge |
| c. Sending gauge defective                                      | Replace sending gauge   |

Charge Warning Light

- |  |                   |
|--|-------------------|
| 1. When ignition switch is turned on, the light does not come on |                   |
| a. Bulb defective  | Replace ( 3 W )   |
| b. Fuse burned out   | Replace ( 5 A )   |
| c. Wire broken or wrong contacted                                | Repair            |
| 2. When engine is started, the light does not go out             |                   |
| a. Light to battery wire grounded                                | Repair            |
| b. Alternator defective  | Repair            |
| c. Voltage regulator defective                                   | Adjust or replace |

Oil Pressure Warning Light

- |   |                 |
|---|-----------------|
| 1. When ignition switch is turned on, the light does not come on  |                 |
| a. Light to ignition switch or to oil pressure switch wire broken | Repair          |
| b. Bulb defective   | Replace ( 3 W ) |
| c. Fuse burned out  | Replace ( 5 A ) |
| d. Oil pressure switch defective                                  | Replace         |
| 2. When engine is revolving, the light does not go out            |                 |
| a. Engine oil insufficient  | Replenish       |

- |  |         |
|--|---------|
| b. Light to oil pressure switch wire shorted | Repair  |
| c. Oil pressure switch defective             | Replace |
| d. Oil pressure low                          | Repair  |

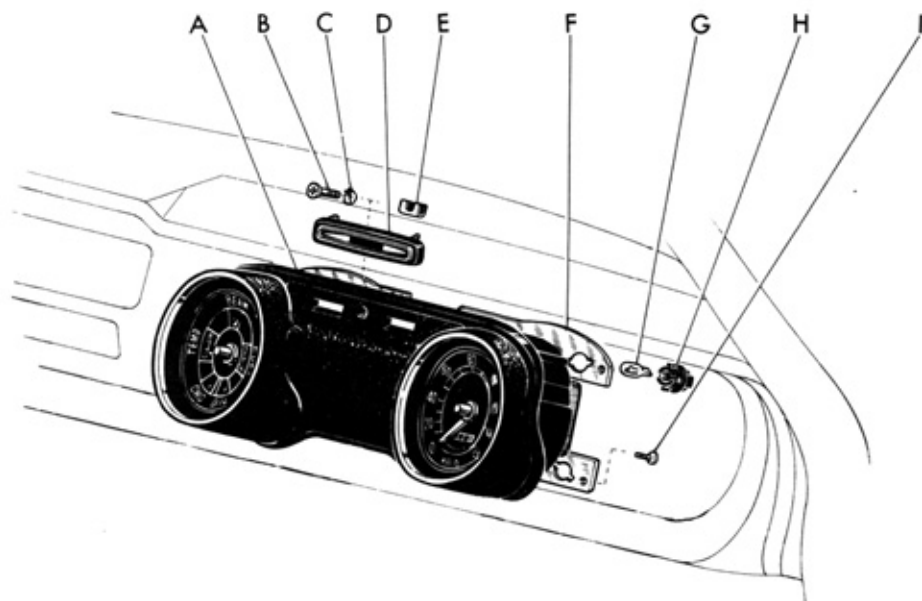
Water Temperature Gauge

- |   |                         |
|---|-------------------------|
| 1. Incorrect indicating                         |                         |
| a. Terminal insufficiently contacted            | Repair                  |
| b. Receiving gauge defective                    |                         |
| (1) Point burned out                            | Replace                 |
| (2) Bi-metal deformed                           | Replace                 |
| c. Sending gauge defective                      | Replace                 |
| 2. No indicating                                |                         |
| a. Wire in the circuit broken                   | Repair                  |
| b. Indicator needle defective                   | Repair or replace       |
| c. Receiving gauge defective                    |                         |
| (1) Heating coil broken                         | Replace receiving gauge |
| (2) Bi-metal deformed                           | Replace receiving gauge |
| d. Sending gauge defective                      | Replace                 |
| 3. Indicator needle registers beyond limit      |                         |
| a. Sending gauge to receiving gauge wire broken | Repair                  |
| b. Receiving gauge defective                    | Replace                 |
| c. Sending gauge defective                      | Replace                 |

Turn Signal Indicator Light

- |  |                         |
|--|-------------------------|
| 1. Flashing cycle differs on right and left sides or operates only on one side |                         |
| a. Bulb burned out   | Replace ( 3 W )         |
| b. Wrong capacity bulb used  | Replace ( 25+25+6+3 W ) |
| c. Light poor grounded   | Correct                 |
| d. Turn signal switch to turn signal light wire broken                         | Correct                 |
| e. Relay coil burned   | Replace                 |
| 2. Turn indicator lights inoperative   |                         |
| a. Indicator light defective   | Replace                 |
| b. Fuse burned out   | Replace                 |
| c. Switch to battery wire broken or wrong contacted                            | Repair                  |
| d. Flasher defective   | Replace                 |
| 3. Turn indicator cancels improperly   |                         |
| a. Less capacity bulb used   | Replace bulb            |
| b. Light poor grounded   | Correct                 |
| c. Voltage dropped   | Correct                 |
| d. Flasher defective   | Replace                 |
| 4. Flashing cycle excessive  |                         |
| a. More capacity bulb used   | Replace                 |
| b. Flasher defective   | Replace                 |

5. Operates occasionally
  - a. Wiring poor contacted                      Correct
  - b. Flasher defective                              Replace
6. Inoperative when the windshield wiper is used
  - a. Point in flasher burned out              Replace flasher
  - b. Wiring in flasher poor contacted        Repair
7. Operates continuously making a noise
  - a. Flasher poor grounded                      Correct
  - b. Flasher defective                              Replace



- |                      |                        |                |
|----------------------|------------------------|----------------|
| A. Combination meter | D. Emblem              | G. Bulb        |
| B. Screw             | E. Spring nut          | H. Bulb socket |
| C. Washer            | F. Meter circuit plate | I. Screw       |

Fig.2-14 Combination Meter Components Y2181

Removal

1. Disconnect the speedometer drive cable from the speedometer.
2. Disconnect the wire harness connections.
3. Remove the turn signal indicator light emblem and the three attaching screws, then remove the combination meter.

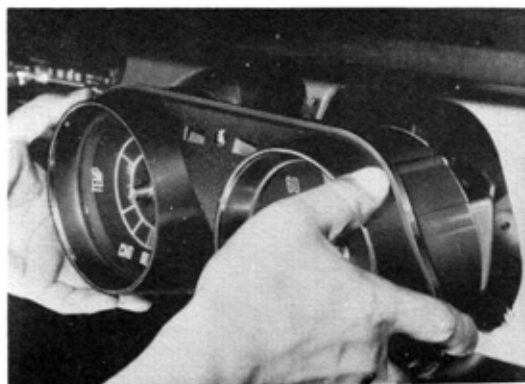
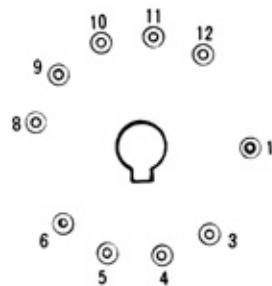
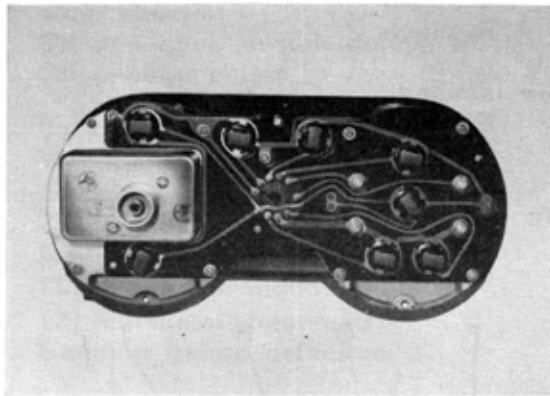


Fig.2-15 Combination Meter Removal V0519





- |                                    |                        |
|------------------------------------|------------------------|
| 1. Water temperature sending gauge | 8. Body ground         |
| 3. Voltage regulator               | 9. Turn signal switch  |
| 4. Fuse block (5A)                 | 10. Turn signal switch |
| 5. Oil pressure sending gauge      | 11. Dimmer switch      |
| 6. Lighting switch                 | 12. Fuel sending gauge |

Fig.2-16 Combination Meter Connections & Wiring V0520, X5712

Inspection

Test for Resistance

1. Set the rotary switch of the circuit tester to the maximum resistance.
2. Check the resistance between the combination meter body and the connectors.  
The resistance should be about zero ohm, but the connectors 1, 3, 4, 5, and 12 are grounded through the heating coils in the

water temperature receiving gauge and fuel receiving gauge, and therefore, the resistance may be about 100 ohm.

Fuel receiving gauge & Water temperature receiving gauge

1. Set a proper rheostat in the circuit as illustrated in the figure 2-18.
2. To test the fuel receiving gauge, set the rheostat to 3 ohms, then the fuel receiving gauge indicator needle should register "F".

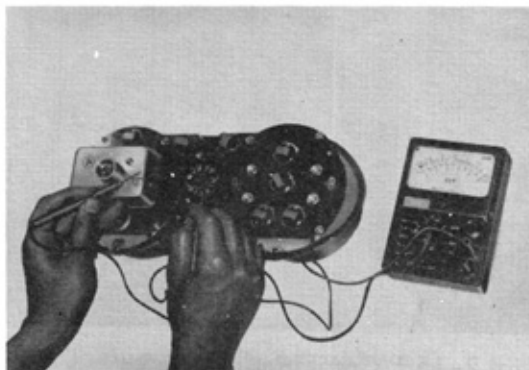


Fig.2-17 Test for Resistance V0521

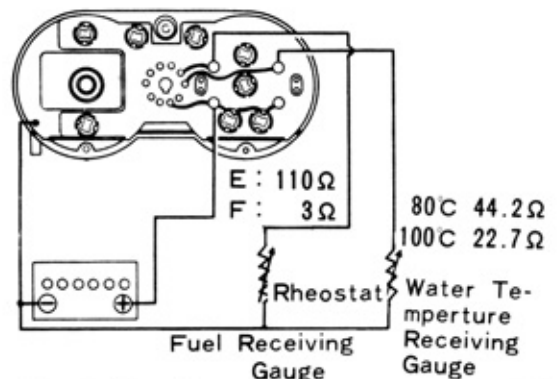


Fig.2-18 Meter Test X4896

Next, set the rheostat to 110 ohms, then the needle should register "E".

- To test the water temperature gauge, set the rheostat to 44.2 ohms, then the water temperature gauge indicator needle should register around 80° C. Next, set the rheostat to 22.7 ohms, then the needle should register around 100° C. The "C", middle line, upper line and "H" show approximately 50 C, 80° C, 100° C, and 110° C respectively.

### Speedometer

- Inspect the speedometer unit with a speedometer tester. The indicating error should not exceed the allowable error. If defective, replace the speedometer.

Standard Indicating	Allowable Error
km/h (m/h)	km/h (m/h)
10 (6)	-1.5 ~ +1.5 (-1.0 ~ +1.0)
20 (13)	-0 ~ +2.5 (-0 ~ +1.6)
40 (25)	-0 ~ +3.0 (-0 ~ +1.9)
60 (38)	-0 ~ +3.5 (-0 ~ +2.2)
80 (50)	-0 ~ +4.5 (-0 ~ +2.8)
100 (63)	-0 ~ +5.0 (-0 ~ +3.2)

- Before testing, check the tires for inflation pressure and wear. Install the speedometer to the vehicle, and inspect the speedometer with a tester. The speedometer should indicate 31.5 to 40.3 km/h (20 to 25 m/h) at the 35 km/h (22 m/h). If necessary, replace the speedometer.
- If the speedometer needle vibrates, check the speedometer cable. If necessary, replace the cable.

### Disassembly

- Turn the meter bulb socket counterclockwise, and remove it.
- Pull out the bulbs.
- Remove the meter sub-assembly attaching screws.
- Remove the meter with gauges.
- Remove the fuel receiving gauge, speedometer, water temperature receiving gauge and light cover.
- Remove the meter circuit plate attaching screws, and remove the circuit plate.

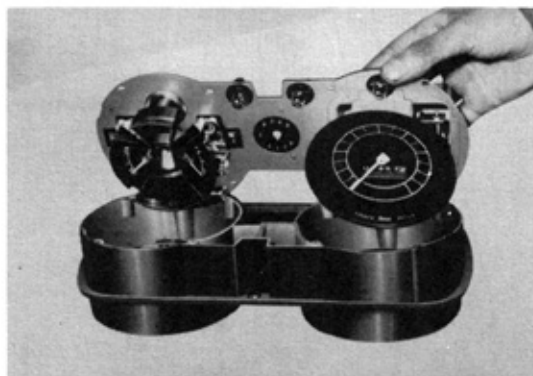


Fig.2-19 Meter Disassembly V0522

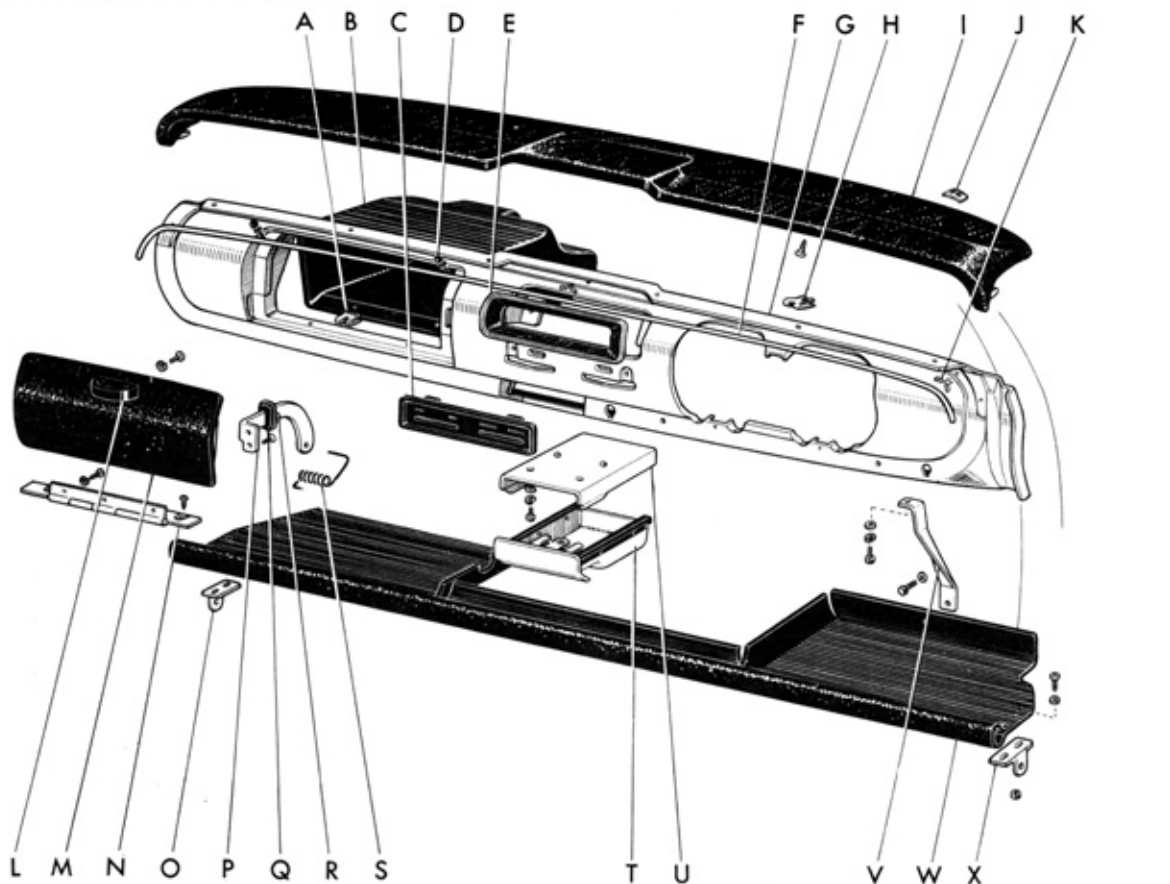
### Assembly

Follow the disassembly procedures in the reverse order. After assembling, ensure that no broken wire is in the circuit plate.

### Installation

Follow the removal procedures in the reverse order.

## INSTRUMENT PANEL



- A. Glove compartment attaching nut
- B. Glove compartment
- C. Heater control hole cover
- D. Cushion
- E. Radio control hole cover
- L. Glove compartment door knob

- M. Glove compartment door
- N. Glove compartment door hinge
- O. Under tray left retainer
- P. Glove compartment door check arm
- Q. Door check arm hole guide
- R. Glove compartment door arm stopper
- S. Torsion spring
- T. Front ash receptacle
- U. Ash receptacle retainer
- V. Instrument panel under tray bracket
- W. Instrument panel under tray
- X. Under tray right retainer

Fig.2-20 Instrument Panel Components

Y2168

INSTRUMENT PANEL  
SAFETY PADRemoval

1. Remove the combination meter by referring page 2-7.

2. Remove the glove compartment.
3. Remove the six attaching screws and eight spring nuts with a driver from inside of the instrument panel, and remove the safety pad.

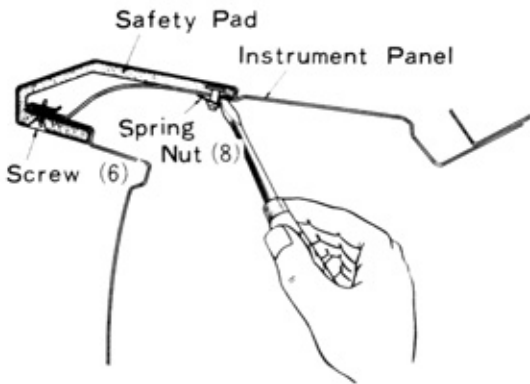


Fig.2-21 Safety Pad Removal X5706

Installation

Follow the removal procedures in the reverse order.

GLOVE COMPARTMENT

Removal

1. Remove the glove compartment door.

2. Remove the three attaching screws, and remove the glove compartment.

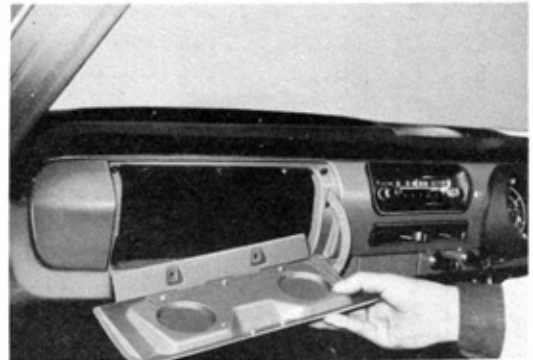


Fig.2-22 Glove Compartment Removal V0945

Installation

Follow the removal procedures in the reverse order.