

SECTION I

TWILIGHT SENTINEL

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DIVISION II

DESCRIPTION AND OPERATION

120-32 TWILIGHT SENTINEL DESCRIPTION

The Twilight Sentinel is an electronic device which automatically controls the on-off operation of the headlights, tail lights, and instrument lights of the car on which it is installed. This operation is in response to the amount of daylight striking a light sensitive cell. A time delay turn-off control permits the car lights to remain on, if desired, for a pre-selected period of time after the ignition switch is turned off. The unit is connected in parallel to the regular light switch circuit and is energized through the ignition switch accessory circuit. No warm-up time is required. The complete system consists of a photocell assembly, an amplifier and a connecting harness.

The photocell assembly consists of a light sensing photocell and a turn-off time-delay control. The unit is mounted on the left windshield post so that the light sensing cell is exposed to direct skylight through the windshield. Light strikes the cell through an opening near the top of the assembly. Sensitivity adjustment is made by rotating the "EARLY-LATE" disc to control the amount of light striking the photocell. The "OFF-MAX DELAY" control selects the desired time the car lights will remain on after the ignition is turned off and also operates the off-on (manual-automatic) switch.

The amplifier assembly provides the power to switch the car lights on or off in response to signals from the photocell assembly. It consists of a transistorized amplifier with a sensitive relay and power relay for actual switching of the lights and a transistorized turn-off time delay circuit. Mounting location is behind the instrument panel on the left side.

120-33 OPERATION - AUTOMATIC

With the "OFF-MAX DELAY" control turned on (anywhere clockwise from "OFF" position), ignition turned on, and regular light switch off, the Twilight Sentinel immediately provides automatic on-off operation of the car lights (no warm-up time required). As evening approaches and daylight is reduced to the point where lights are needed for safe driving, the Twilight Sentinel will automatically turn on the car lights. The desirable time at which this takes place may be selected by the driver by rotating the "EARLY-LATE" disc on the photocell assembly. Rotating clockwise reduces the amount of light striking the sensitive surface through the window and turns on lights earlier. To turn lights on later, rotate cap counterclockwise.

CAUTION: Adjust "EARLY-LATE" disc in small steps to avoid overcorrecting.

This is necessary due to the Sentinel being designed with a built-in time delay to ignore rapid changes in light level. This built-in time delay prevents lights turning on or off immediately if light level is changed suddenly while car is passing under trees, shadows, overpass, bright lights, etc. The delay period normally ranges between 10 and 30 seconds. However, in some units time delay could range as high as 60 seconds.

The *adjustable* time delay turn-off feature permits the car lights to remain on for a pre-selected period after the ignition is turned off. The driver may choose any delay period from approximately three seconds to a maximum of approximately three minutes by rotating the "OFF-MAX DELAY" control to the desired position. Additional side lighting can be obtained by turning on a cornering light, if car is so equipped.

When the car is in a garage the lights may turn on when the ignition is turned on because of the low light level. However, when the car is driven into daylight the lights will turn off (after time delay elapses).

120-34 OPERATION - MANUAL

If the driver desires to turn his lights on during daylight hours, he may do so by operating the regular light switch. This overrides the Twilight Sentinel and the regular light switch must be turned off before the Twilight Sentinel can regain control.

To obtain manual control of the car lights at the regular light switch, turn off the Twilight Sentinel by rotating "OFF-MAX DELAY" control completely counterclockwise to "OFF" (manual position). Lights will now operate only by the regular light switch. In some states the law requires that car lights remain off in certain tunnels. If the light level is low enough so the Twilight Sentinel turns on the lights, then the manual-automatic switch must be placed in the above position to comply with the law.

All sensitivity adjustments are made by rotating the "EARLY-LATE" disc of the photocell assembly to change the window dimensions over the photocell. For this reason, no sensitivity adjustment equipment is required.

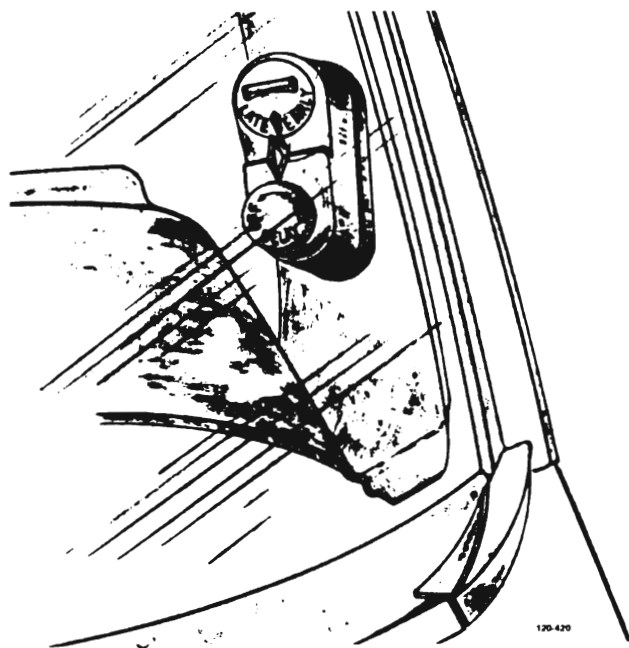


Figure 120-122 Photocell Assembly

Due to high light levels during daylight hours, the sensitivity should be adjusted at the approximate time the lights are desired to turn on.

DIVISION IV

TROUBLE DIAGNOSIS

120-35 TYPICAL COMPLAINTS

If trouble is reported, the condition will generally be one of the following:

1. Lights turn on too early or too late in the evening.
2. Lights remain on during daytime driving.
3. Lights fail to turn on automatically.
4. No turn-off time delay.
5. Excessive turn-off time delay or lights fail to turn off after ignition is turned off.

The following checks should be performed in sequence during your diagnosis to determine the cause and correction and to eliminate unnecessary service work.

120-36 PRELIMINARY CHECKS

1. Check "OFF-MAX DELAY" knob for possibility of being rotated counterclockwise to "OFF".
2. Make sure owner is not covering photocell assembly with some object.
3. Make sure he is operating unit with light switch turned off.
4. Check tail light fuse for possible burnout.
5. Check for disconnected photocell assembly.

If steps 1 through 5 indicate condition to be more serious, proceed to

Trouble. If checks 1 through 3 indicate owner misunderstanding,

proper operation should be explained to him.

120-37 ISOLATING TROUBLE

Because of the high light levels needed to operate the Twilight Sentinel, a flashlight or at least 50 watt 110 volt bulb should be held close to the photocell through windshield whenever light is needed. **NOTE:** Flashlight should be a standard 2-cell with batteries in good condition.

1. Rotate "EARLY-LATE" disc to extreme clockwise (EARLY) position.

2. Place "OFF-MAX DELAY" control just clockwise of "OFF" position. 3. Turn regular light switch off.

4. Turn ignition on but do not start engine. Car lights should turn on within three seconds. If they do, proceed to step 5. If lights are slow in turning on (more than ten seconds) or fail to turn on, perform the following checks:

(a) If headlights turn on but tail lights do not, check for blown tail light fuse at fuse panel.

(b) Turn regular light switch on. If headlights fail to turn on, check for defective car wiring or connections between amplifier and light switch. Turn regular light switch off.

(c) Check for loose ground connection or loose wire harness connection at amplifier unit. Connect jumper

wire between body ground and purple wire in amplifier 10-way connector. If lights turn on, check ground path through manual-automatic switch to windshield pillar.

(d) Disconnect black wire (amplifier to photocell) from amplifier 10-way connector. If lights turn on, photocell unit is shorted and must be replaced.

(e) If car lights still fail to turn on after performing steps a through d, the amplifier is defective and must be replaced.

5. Rotate "EARLY-LATE" disc to extreme counterclockwise (LATE) position. Shine bright light (flashlight) through windshield to photocell window. Car lights should turn off within 10 to 60 seconds. If so, proceed to step 6. If not, perform the following steps:

(a) Check for open wire connections between amplifier and photocell. (Black and gray wires on amplifier side of 10-way connector, two black wires on car wiring side to photocell assembly 5-prong connector, or black and brown wires in photocell assembly cable.

(b) Connect jumper wire between black and gray wires (amplifier to photocell) on amplifier side of 10-way connector. If car lights turn off within 10 to 60 seconds, photocell is disconnected or defective. If defective, the photocell assembly must be replaced. If lights remain on, amplifier is defective and must be replaced.

6. Rotate "OFF-MAX DELAY" control to maximum time delay (extreme clockwise). With ignition turned on, the headlights should turn on within 10 to 60 seconds. Now turn ignition off. Car lights should remain on for one to three minutes. If lights fail to operate as described above, perform the following checks as required:

(a) No time delay or insufficient time delay after ignition turn off. Check for shorted wiring, open tail light fuse, or defective time delay control section of photocell assembly. If control is defective, replace photocell assembly. If no defects are indicated in wiring or control, the amplifier is defective and must be replaced.

(b) Excessive time delay or lights fail to turn off after ignition turn off. Check for open wire connection or open time delay control section of photocell assembly. If control is defective, replace photocell assembly. If no defects are indicated in wiring or time delay control, the amplifier is defective and must be replaced.

7. If Twilight Sentinel responded to all of the above tests, the unit is functioning normally. Perhaps the owner can be helped by an explanation on how he may personally select his own sensitivity adjustment by rotating the "EARLY-LATE" disc. He may also need assistance in understanding operation of the regular light switch and of the off-on time delay control.

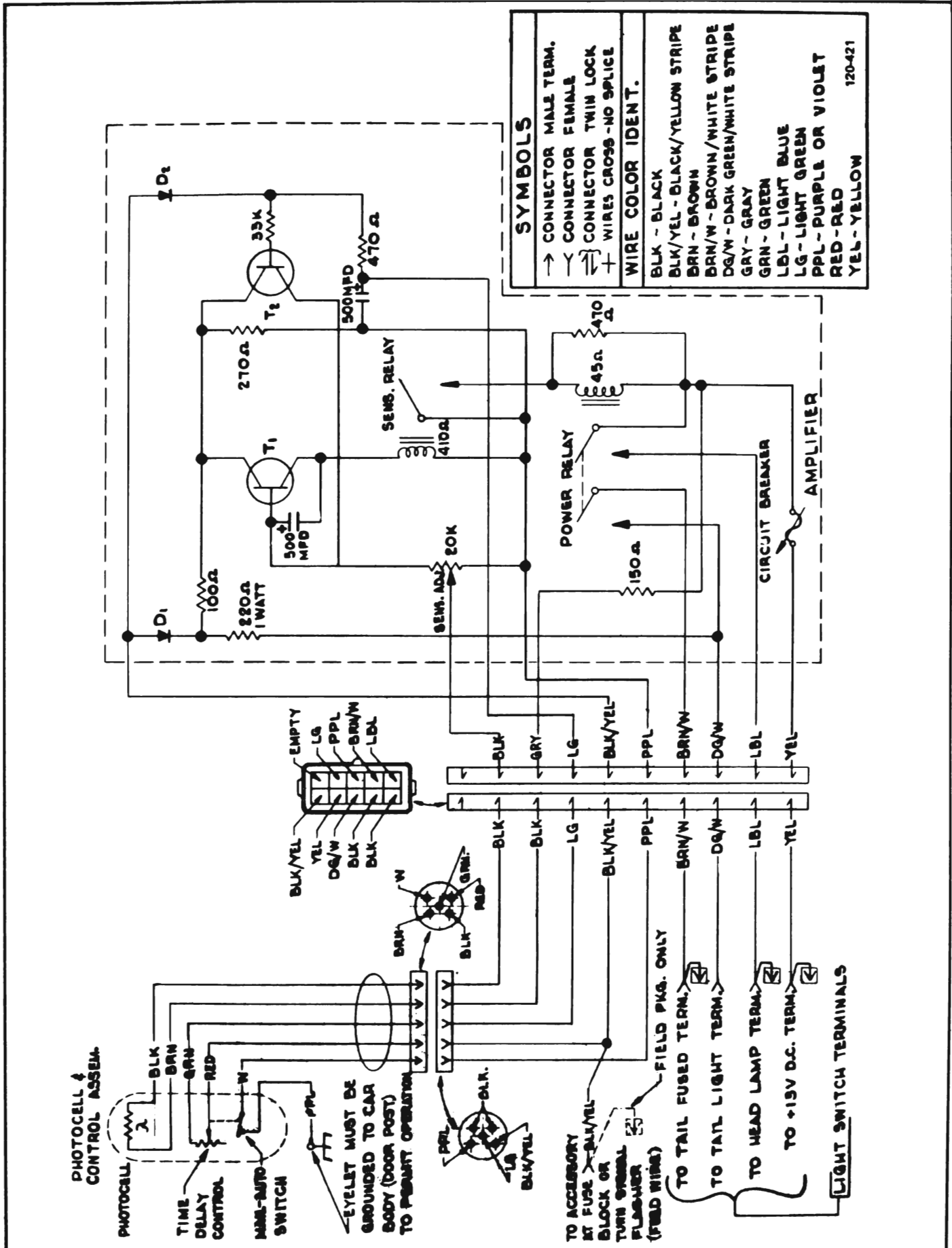


Figure 120-123 Twilight Sentinel Wiring Diagram

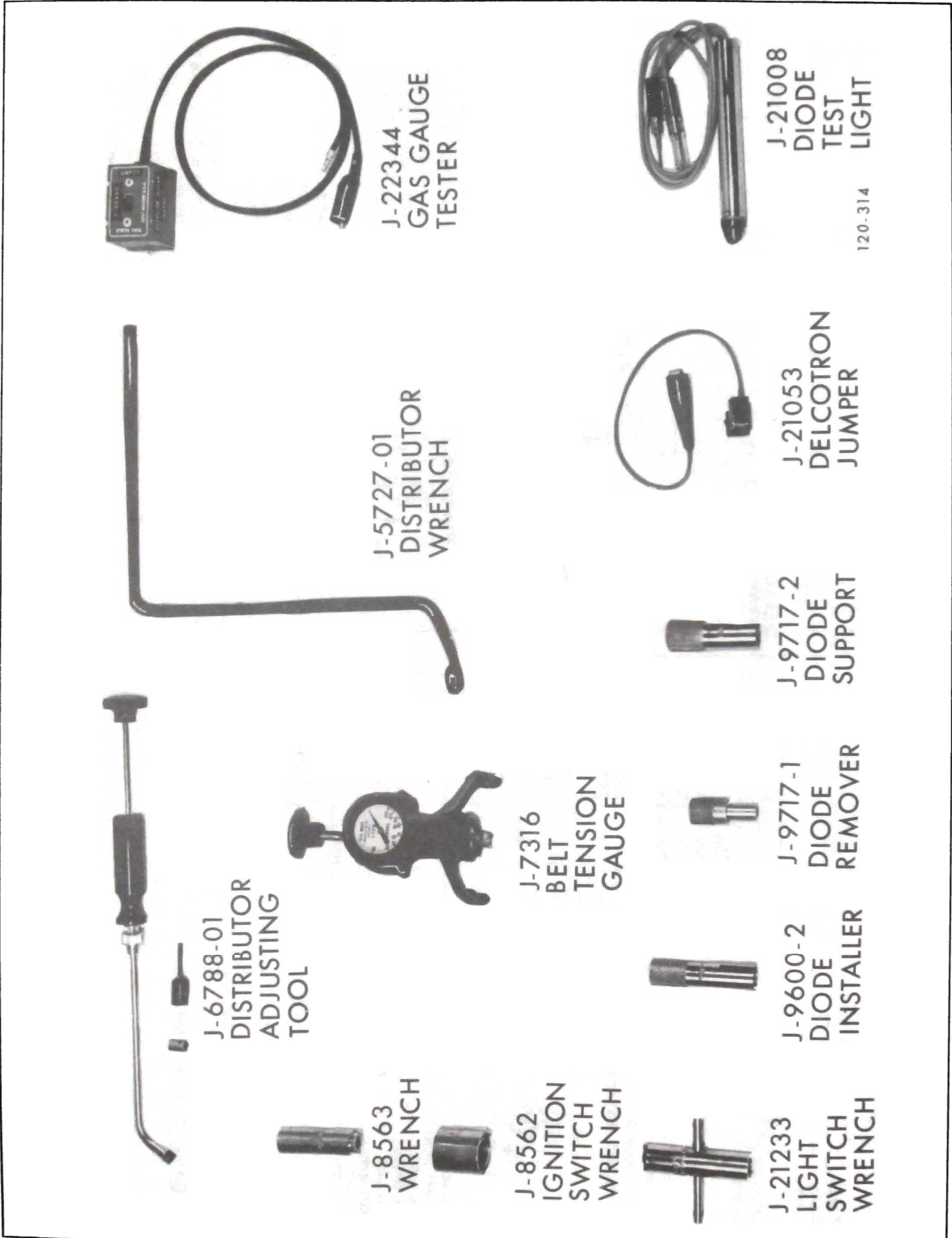


Figure 120-124 Electrical System
Special Tools