SECTION 11-F

TWILIGHT SENTINEL

11-23 Twilight Sentinel

a. 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 light striking a light sensitive cell. The complete system consists of three units--photocell, amplifier and manual-automatic switch. See Figure 11-145.

The photocell is a photo-conductive type and is mounted face up, behind the windshield, so it is exposed to direct sky light which is converted into an electrical signal which is used by the amplifier unit.

The amplifier unit applies voltage to the photocell and switches the car lights on or off in response to a signal from the photocell. The amplifier unit consists of a transistor amplifier, sensitive relay, and power relay. It is mounted on the right front door hinge pillar behind the kick pad. See Figure 11-146.

The manual-automatic switch is a push-pull type switch and is mounted below the manual light switch.

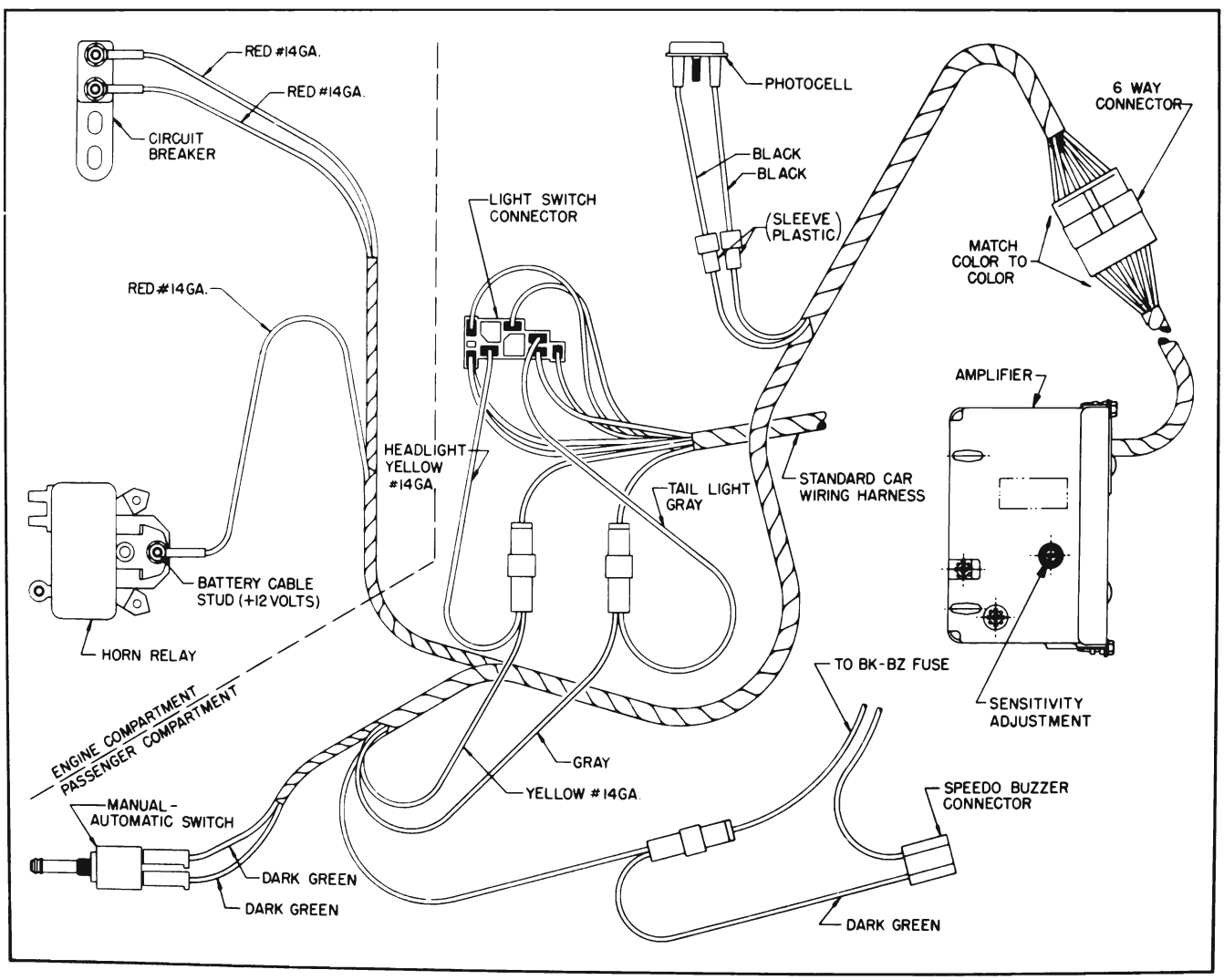


Figure 11-145—Twilight Sentinel Wiring Diagram

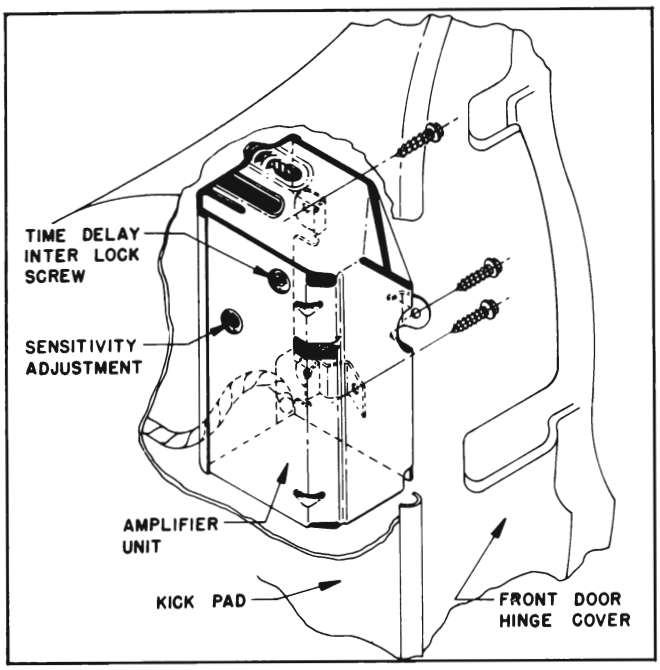


Figure 11-146—Twilight Sentinel Amplifier

b. Operation

With the manual-automatic switch in automatic (pushed in) position and the ignition "on", the Twilight Sentinel provides completely automatic operation which turns the car lights on or off according to the light level. As evening approaches and daylight is reduced to the point where lights are needed for safe driving, the Twilight Sentinel will turn the car lights on.

A built-in ratio prevents the lights turning off when passing under bright street lighting. During daylight hours while car lights are not required the Twilight Sentinel will keep the lights turned off. A time-delay feature is incorporated to prevent the car lights turning on immediately if the light level is reduced suddenly while the car is passing under trees, shadows, overpass, etc. When the ignition is turned off, the Twilight Sentinel is inoperative and the lights will turn off.

When the car is in a garage, the lights may turn on because of the low light level. However, as soon as the car is driven into the direct daylight, the lights will be turned off by the Twilight Sentinel.

If the driver desires to turn his lights on during the daylight hours, he may do so by operating the standard light switch in the normal manner. This by-passes the Twilight Sentinel and the lights must be turned off at the standard switch before the Twilight Sentinel can again control the lights.

In manual (pulled out) position of the manual-automatic switch, the Twilight Sentinel does not function. While switch is in this position, the car lights must be manually operated by the standard light switch. In some states, the law requires that the car lights remain off in certain tunnels. If the light level is low enough so that the Twilight Sentinel turns the lights on, the manual-automatic switch must be placed in manual position in order to comply with the law.

The Twilight Sentinel needs no warm-up time and it will provide immediate automatic control whenever the switch is in automatic position.

c. Trouble Shooting

The Twilight Sentinel is adjusted at the factory and should maintain its adjustment. Of course, there may be occasions when the adjustment is questioned. Like any other electrical device, a misunderstanding of the operation of the unit may lead to the belief that an adjustment is necessary. The following troubles may be reported:

1. Normal Complaints

(a) Lights turn on too late in evening.

(b) Light turn on too soon in evening.

(c) Lights remain on during the day.

(d) Lights fail to come on.

While the above complaints may be corrected by simple sensitivity adjustments in most cases, a few on-car checks should be made to determine if the difficulty is more serious than can be corrected by adjustment.

2. Checking Operation

Because of the high light levels needed to operate the Twilight Sentinel, a flashlight or field tester should be held close to the photocell whenever light is needed.

Place manual-automatic switch in automatic (pushed in) position. Place manual light switch in off position. Start engine and hold a black cloth over photocell. Lights should be on. Remove cloth. Lights may or may not turn off. If not, shine flashlight into cell. Lights should now turn off.

If the Twilight Sentinel performs as stated above, it will perform satisfactorily after the proper adjustments are made.

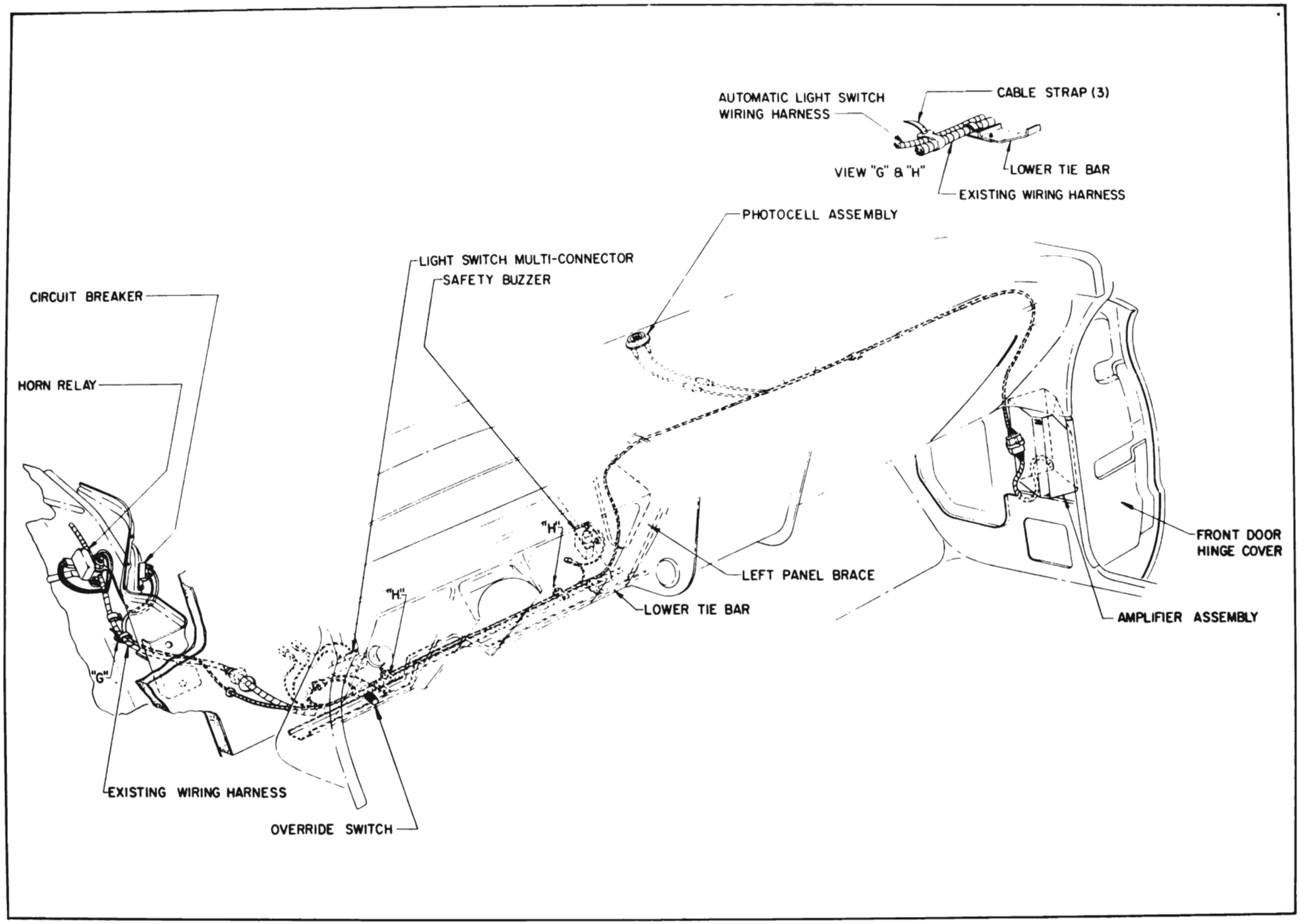


Figure 11-147—Twilight Sentinel Installation

3. Isolating Trouble

(a) Failure of Lights to Turn On

(1) First check BK-BZ fuse, then place manual-automatic switch in automatic position. Place manual light switch in off position. Turn on ignition and place a black cloth over photocell. Lights should turn on. If not, remove one of black wires to photocell. If lights go on, trouble is in photocell and it should be replaced. If lights remain off, proceed with Step 2.

(2) Disconnect six-way connector near amplifier. Place a jumper between fourteen gage red wire and the fourteen gage yellow wire of car harness. If headlights turn on, trouble is in amplifier and it should be removed from car for repair by an authorized warranty repair dealer (United Motors Service). If not, trouble is wiring harness or circuit breaker.

(b) Failure of Lights to Turn Off

(1) Place manual-automatic switch in automatic position. Place manual light switch in off position and turn on ignition. Shine flashlight into cell-lights should be off. If not, remove the two black wires from photocell and short them together. If lights go off, trouble is in photocell and it should be replaced. If not, proceed with Step 2.

(2) Disconnect the six-way plug near the amplifier. If lights go off, trouble is in amplifier and it should be removed for further testing. If lights remain on, trouble is in car harness.

d. Sensitivity Test and Adjustment on Car

The sensitivity test and sensitivity adjustment are made using the Guide-Matic Tester J-8465 in conjunction with the Twilight Sentinel Test Head J-8627. See Figure 11-148.

1. Preliminary Set-Up

(a) Insert red and black plugs of Test Head J-8627 into the respective jacks of Tester J-8465.

(b) Check "ZERO SET" of meter.

(c) Place test head on photocell. IMPORTANT: Test head must be properly seated on photocell or sensitivity readings will be in error.

(d) Connect red power lead of tester to 12 volts and black lead to ground.

(e) "DIM-HOLD" switch of tester should

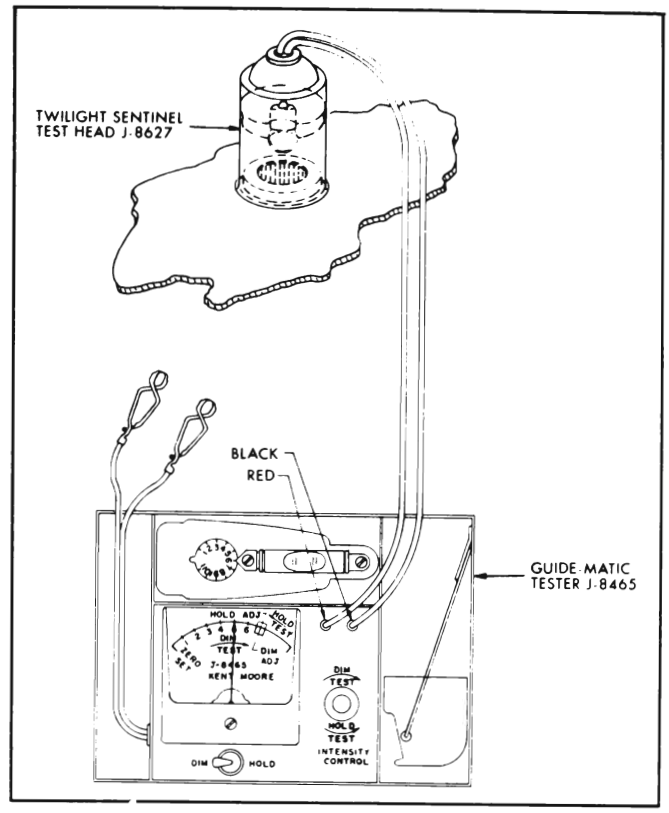


Figure 11-148—Guide-Matic Tester J-8465 with Test Head J-8627

be in "DIM" position for all tests and adjustments of Twilight Sentinel.

(f) Place the manual-automatic switch in automatic position.

(g) Set engine on fast idle and proceed with test.

2. Sensitivity Test on Car

(a) Rotate "INTENSITY CONTROL" completely clockwise. Lights should be off. If not, proceed to Sensitivity Adjustment.

(b) Turn "INTENSITY CONTROL" slowly counterclockwise until lights turn on. IMPORTANT: Because of the time delay feature the "INTENSITY CONTROL" must be rotated slowly to give the correct sensitivity reading. The meter pointer must be on "5". If reading is incorrect, proceed to Sensitivity Adjustment on Car.

(c) Turn control clockwise until lights turn off. Meter reading should be between "6" and "DIM ADJ." line. If the Twilight Sentinel is out of adjustment, proceed to Sensitivity Adjustment on Car.

3. Sensitivity Adjustment on Car

Follow steps in "Preliminary Set-Up" and

remove right kick pad to allow access to "Twilight Sentinel" sensitivity adjustment control. NOTE: THE TIME DELAY SHOULD BE REMOVED BY REMOVING THE TIME DELAY INTERLOCK SCREW. SEE FIGURE 11-146. THIS WILL ALLOW THE SENSITIVITY ADJUSTMENT TO BE MADE FASTER BY REMOVING THE TIME DELAY CAPACITOR FROM THE CIRCUIT.

Follow steps in Preliminary Set-Up and remove right kick pad to allow access to sensitivity adjustment. See Figure 11-146.

(a) Turn sensitivity adjustment clockwise and "INTENSITY CONTROL" clockwise. Lights should be off.

(b) Rotate "INTENSITY CONTROL" counterclockwise until meter pointer is on "5".

(c) Rotate sensitivity adjustment slowly counterclockwise until lights turn on.

(d) Recheck sensitivity as shown in steps (a) through (c) under Sensitivity Tests on Car.

(e) Replace interlock screw and kick pad.

e. Removal of Units from Car

IMPORTANT: Place manual-automatic switch in manual position before proceeding with removal procedures. Also, remove battery ground strap from battery.

Car lights will function properly by using the regular car light switch after the removal of any component if the following instructions are observed:

1. Amplifier Removal

(a) Remove the right-hand kick pad and disconnect the six-way connector.

(b) Remove right front door hinge cover.

(c) Remove three screws from door post and remove amplifier.

2. Photocell Removal

(a) Disconnect the two black leads of photocell from harness.

(b) Remove upper instrument panel.

(c) Remove photocell and replace upper instrument panel.

3. Manual-Automatic Switch Removal

(a) Remove knob and disconnect two wires from rear of switch.

(b) Tape exposed terminals separately to prevent grounding.

(c) Remove switch.

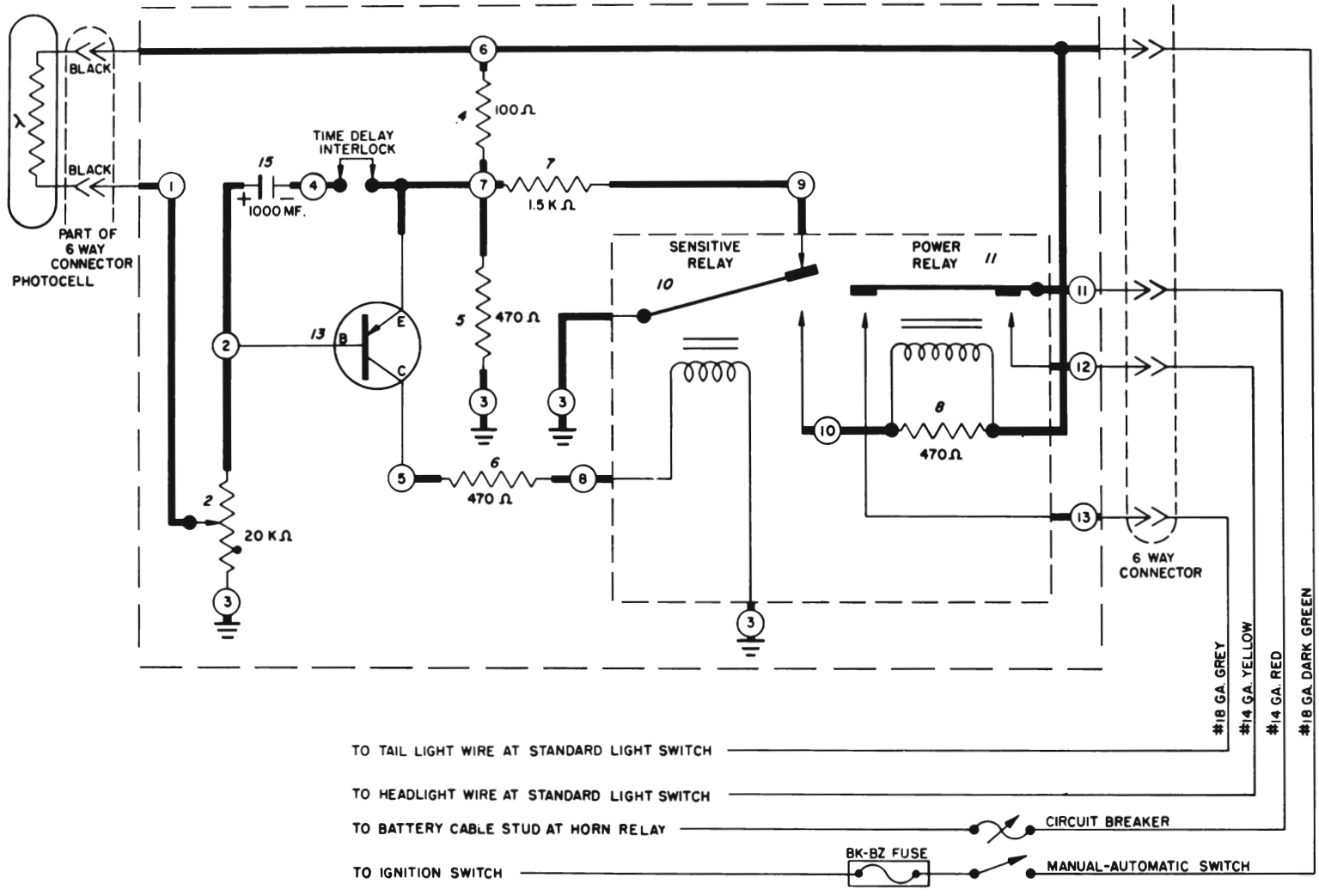
4. Circuit Breaker Removal

(a) Remove #14 red wire from battery cable stud of horn relay.

(b) Remove two #14 red wires from circuit breaker and remove circuit breaker from starter relay mounting bolts.

(c) Replace nuts on starter relay mounting bolts.

(d) Do not replace #14 red wire on horn relay battery stud until circuit breaker is replaced.



CHECK POINTS	1	2	3	*4	5	6	7	8	9	10	11	12	13
LIGHTS ON	0.5 9.1	9.0	0	9.0	9.0	12.0	9.0	4.2	9.0	0	12.0	12.0	12.0
LIGHTS OFF	8.5 11.7	8.5 11.8	0	8.8 11.8	0	12.0	9.0 10.0	0	0	12.0	12.0	0	0

12.0 VOLTS INPUT. ALL VOLTAGES MEASURED WITH V.T.V.M.
* TIME DELAY INTERLOCK OPEN.

Figure 11-149—Twilight Sentinel Schematic Diagram