GENERAL INFORMATION

INTRODUCTION

Following are general descriptions of the major components in the turn signal and hazard warning systems. Refer to 8W-52 - Turn Signals in Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

DESCRIPTION AND OPERATION

TURN SIGNAL SYSTEM

With the ignition switch in the On position, and the multi-function switch control lever moved up (right turn) or down (left turn), the turn signal system is activated. The switch has a detent position in each direction that provides turn signals with automatic cancellation, and an intermediate momentary position in each direction that provides turn signals only until the multi-function switch lever is released.

When the turn signal switch is in a detent position, it is turned off by one of two cancelling cam lobes molded into the hub of the clockspring mechanism. When turning the steering wheel causes one of the cam lobes to contact a cancel actuator in the multi-function switch, the turn signal switch automatically returns to the off position.

When the turn signal system is activated, the selected (right or left) turn signal indicator lamp, front park/turn signal lamp, front side marker lamp, and rear tail/stop/tail signal lamps will flash. With the headlamp switch in the Off position, the front turn signal and front side marker lamps flash in unison. With the headlamp switch in the On position, the front turn signal and front side marker lamps flash alternately.

HAZARD WARNING SYSTEM

The hazard warning system is activated by a switch button in the multi-function switch. The button is located on the top of the steering column between the steering wheel and the instrument panel. The hazard warning switch button is identified with a double triangle.

The hazard warning system is connected to a non-switched battery feed so that the system remains functional, regardless of the ignition switch position. Slide the switch button to the left to activate the hazard warning system, and slide the switch button to the right to turn the system off.

When the hazard warning system is activated, the right and left turn signal indicators, front park/turn signal lamps, front side marker lamps, and rear tail/stop/tail signal lamps will flash. With the headlamp switch in the Off position, the front turn signal and front side marker lamps flash in unison. With the head or park lamps turned on, the front turn signal and front side marker lamps flash alternately.

COMBINATION FLASHER

The combination flasher is a smart relay that functions as both the turn signal system and hazard warning system flasher. The combination flasher contains active electronic Integrated Circuitry (IC) elements. This flasher is designed to handle the current flow requirements of the factory-installed lighting. If supplemental lighting is added to the turn signal lamp circuits, such as when towing a trailer with lights, the combination flasher will automatically try to compensate to keep the flash rate the same.

While the combination flasher has a International Standards Organization (ISO)-type relay terminal configuration or footprint, the internal circuitry is much different. The combination flasher does not use...
standard ISO-relay inputs or provide ISO-relay type outputs or functions. The combination flasher should never be substituted for an ISO-relay or replaced with an ISO-relay, or else component and vehicle damage may occur.

The combination flasher has five blade-type terminals intended for the following inputs and outputs: Battery B+, Ignition B+, Ground, Turn Signal circuit, and Hazard Warning circuit. Constant battery voltage and ground are supplied to the flasher so that it can perform the hazard warning function, and ignition switched battery voltage is supplied for the turn signal function. Refer to 8W-52 - Turn Signals in Group 8W - Wiring Diagrams for complete circuit descriptions, diagrams and terminal function identification.

The IC within the combination flasher (Fig. 1) contains the logic that controls the flasher operation and the flash rate. Pin 6 of the IC receives a sense voltage from the hazard warning portion of the multi-function switch. When the hazard switch is turned on, the “hazard on sense” voltage will become low due to the circuit being grounded through the turn signal bulbs. This low voltage sense signals the IC to energize the flash control PNP transistor at a pre-calibrated flash rate or frequency. Each time the PNP transistor energizes the turn signal circuit, the pin 8 “turn signal on sense” voltage will become high and the IC signals the PNP transistor to de-energize the circuit. This cycling will continue until the right or left turn signal is turned off.

A special design feature of the combination flasher allows it to “sense” that a turn signal circuit or bulb is not operating, and provide the driver an indication of the condition by flashing the remaining bulbs in the affected circuit at a higher rate (120 flashes-per-minute or higher). Conventional flashers either continue flashing at their typical rate (heavy-duty type), or discontinue flashing the affected circuit entirely (standard-duty type). During turn signal operation, the combination flasher IC compares normal battery voltage input on pin 2 with the shunt resistor voltage input on pin 7. If the IC “senses” that the voltage difference between pin 2 and pin 7 is different than the pre-calibrated value of the IC, it will increase the rate at which it signals the PNP transistor to energize the pin 1 output. Thus, the inoperative half (left or right side) of the turn signal circuit will flash faster.

Because of the active electronic elements within the combination flasher, it cannot be tested with conventional automotive electrical test equipment. If the combination flasher is believed to be faulty, test the turn signal and hazard warning system circuits as described in this group. Then replace the combination flasher with a known good unit to confirm system operation.

The combination flasher cannot be repaired and, if faulty or damaged, it must be replaced.

**TURN SIGNAL SWITCH AND HAZARD WARNING SWITCH**

The turn signal and hazard warning switches are integral to the multi-function switch assembly. The multi-function switch assembly is mounted to the left side of the steering column (Fig. 2). This switch contains circuitry for the following functions:

- Turn signals
- Hazard warning
- Headlamp beam selection
- Headlamp optical horn.

The information contained in this group addresses only the multi-function switch functions for the turn signal and hazard warning circuits. For information relative to the other switch functions, refer to the proper group. However, the multi-function switch cannot be repaired. If any function of the multi-func-

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**Fig. 1 Combination Flasher - Typical**

Likewise, pin 8 of the IC receives a sense voltage from the turn signal portion of the multi-function switch. When the left or right turn signal is turned on, the “turn signal on sense” voltage will become low due to the circuit being grounded through the turn signal bulbs. This low voltage sense signals the IC to energize the flash control PNP transistor at a pre-calibrated flash rate or frequency. Each time the PNP transistor energizes the turn signal circuit, the pin 8 "turn signal on sense" voltage will become high and the IC signals the PNP transistor to de-energize the circuit. This cycling will continue until the right or left turn signal is turned off.
DESCRIPTION AND OPERATION (Continued)

ition switch is faulty, or if the switch is damaged, the entire switch assembly must be replaced.

HAZARD WARNING BUTTON

CANCEL ACTUATOR

CONTROL STALK

Fig. 2 Multi-Function Switch

TURN SIGNAL INDICATOR LAMP
The turn signal indicator lamps are located in the instrument cluster. They flash with the exterior turn signal lamps to give the driver a visual indication that a turn signal or the hazard warning system is operating. For diagnosis and service of these lamps, refer to Group 8E - Instrument Panel Systems.

TURN SIGNAL LAMP
The exterior lamps in the turn signal and hazard warning circuits include the front park/turn signal, the front side marker, and the rear tail/stop/turn signal. For diagnosis and service of these lamps, refer to Group 8L - Lamps.

DIAGNOSIS AND TESTING

INTRODUCTION
When diagnosing the turn signal or hazard warning circuits, remember that high generator output can burn out bulbs rapidly and repeatedly. If this is a problem on the vehicle being diagnosed, refer to Group 8C - Charging System for further diagnosis of a possible generator overcharging condition.

WARNING: ON VEHICLES EQUIPPED WITH AIR-BAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIR-BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Turn the ignition switch to the On position. Actuate the turn signal lever or hazard warning button. Observe the turn signal indicator lamp(s) in the instrument cluster. If the flash rate is very high, check for a turn signal bulb that is not lit or is very dimly lit. Repair the circuits to that lamp or replace the faulty bulb, as required. Test the operation of the turn signal and hazard warning systems again. If the turn signal indicator(s) fail to light, go to Step 2.

(2) Turn the ignition switch to the Off position. Check the turn signal fuse in the fuseblock module and/or the hazard warning fuse in the Power Distribution Center (PDC). If OK, go to Step 3. If not OK, repair the shorted circuit or component as required and replace the faulty fuse(s).

(3) Turn the ignition switch to the On position to check for battery voltage at the turn signal fuse in the fuseblock module; or, leave the ignition switch in the Off position to check for battery voltage at the hazard warning fuse in the PDC. If OK, go to Step 4. If not OK, repair the open circuit as required.

(4) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Unplug the combination flasher from its wire harness connector and replace it with a known good unit. Connect the battery negative cable. Test the operation of the turn signal and hazard warning systems. If OK, discard the faulty combination flasher. If not OK, remove the test flasher and go to Step 5.

(5) Turn the ignition switch to the On position. Check for battery voltage at the combination flasher input circuit cavity in the combination flasher wire harness connector. If OK, go to Step 6. If not OK, go to Step 8.

(6) Turn the ignition switch to the Off position. Place the hazard warning switch in the On position. Check for battery voltage again at the combination flasher input circuit cavity in the combination flasher wire harness connector. If OK, go to Step 7. If not OK, go to Step 8.

(7) Disconnect and isolate the battery negative cable. Check for continuity between the ground cir-
cuit cavity of the combination flasher wire harness connector and a good ground. There should be continuity. If OK, go to Step 8. If not OK, repair the circuit to ground as required.

(8) Unplug the multi-function switch wire harness connector as described in this group. Check for continuity between the combination flasher input circuit cavities in the combination flasher wire harness connector and in the multi-function switch wire harness connector. There should be continuity. If OK, go to Step 9. If not OK, repair the open circuit as required.

(9) Check for continuity between the combination flasher output circuit cavities in the combination flasher wire harness connector and in the multi-function switch wire harness connector. There should be continuity. If OK, test the multi-function switch as described in this group. If not OK, repair the open circuit as required.

MULTI-FUNCTION SWITCH

Perform the diagnosis of the hazard warning and/or turn signal systems as described in this group before testing the multi-function switch. For circuit descriptions and diagrams, refer to 8W-52 - Turn Signals in Group 8W - Wiring Diagrams.

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(1) Disconnect and isolate the battery negative cable. Unplug the multi-function switch wire harness connector.

(2) Using an ohmmeter, perform the switch continuity checks at the switch terminals as shown in the Multi-Function Switch Continuity chart (Fig. 3).

(3) If the switch fails any of the continuity checks, replace the faulty switch. If the switch is OK, repair the lighting circuits as required.

Fig. 3 Multi-Function Switch Continuity

REMOVAL AND INSTALLATION

COMBINATION FLASHER

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(1) Disconnect and isolate the battery negative cable.

(2) Remove the knee blocker from the instrument panel. Refer to Knee Blocker in Group 8E - Instrument Panel Systems for the procedures.

NOTE: The combination flasher and flasher mounting bracket are serviced only as a unit.
REMOVAL AND INSTALLATION (Continued)

(3) Reach through the inboard side of the steering column opening in the instrument panel and remove the screw that secures the combination flasher mounting bracket to the upper steering column mounting bracket (Fig. 4).

(4) Lower the combination flasher and mounting bracket far enough to access the wire harness connector.

(5) Unplug the combination flasher from the wire harness connector.

(6) Remove the combination flasher and bracket from the vehicle.

(7) Install the combination flasher by aligning the flasher terminals with the cavities in the wire harness connector and pushing the flasher firmly into place.

(8) Install the combination flasher and mounting bracket to the upper steering column mounting bracket. Tighten the mounting screw to 4 N·m (35 in. lbs.).

(9) Install the knee blocker to the instrument panel. Refer to Knee Blocker in Group 8E - Instrument Panel Systems for the procedures.

(10) Connect the battery negative cable.

(11) Test the flasher operation.

MULTI-FUNCTION SWITCH

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the knee blocker from the instrument panel. See Knee Blocker in Group 8E - Instrument Panel Systems for the procedures.

(3) If the vehicle is so equipped, move the tilt steering column to the fully raised position.

(4) Insert the key in the ignition lock cylinder and turn the ignition switch to the On position.

(5) Insert a small screwdriver or pin punch through the access hole in the lower steering column shroud and depress the ignition lock cylinder retaining tumbler (Fig. 5).

(6) While holding the retaining tumbler depressed, pull the ignition lock cylinder and key out of the ignition lock housing.

(7) Remove the three screws that secure the lower steering column shroud to the upper shroud.

(8) If the vehicle is so equipped, loosen the two nuts that secure the non-tilt steering column upper mounting bracket to the dash panel steering column support bracket studs. Lower the column far enough to remove the upper steering column shroud.

(9) Remove both the upper and lower shrouds from the steering column.
REMOVAL AND INSTALLATION (Continued)

(10) Remove the two screws that secure the switch water shield and bracket to the top of the steering column (Fig. 6).

(11) Remove the one screw located below the multi-function switch lever that secures the switch water shield and bracket to the steering column (Fig. 7).

(12) Gently pull the lower mounting tab of the switch water shield bracket away from the steering column far enough to clear the screw boss below the multi-function switch lever.

(13) Lift the water shield and bracket with the multi-function switch away from the steering column far enough to access the two multi-function switch wire harness connectors. If the vehicle is equipped with the optional tilt steering column, lifting gently upward on the tilt release lever will provide additional clearance to ease multi-function switch removal.

(14) Unplug the wire harness connectors from the multi-function switch.

(15) Remove the multi-function switch and water shield from the steering column as a unit.

(16) Gently pull the water shield over the hazard warning switch knob and the multi-function switch lever.

(17) Reverse the removal procedures to install. Tighten the upper switch mounting screws to 2.2 N·m (20 in. lbs.). Tighten the lower switch water shield and bracket screw to 1.1 N·m (10 in. lbs.). Tighten the non-tilt steering column mounting nuts to 22 N·m (200 in. lbs.) and the steering column shroud mounting screws to 2 N·m (18 in. lbs.).