

TURN SIGNAL AND HAZARD WARNING SYSTEMS

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GENERAL INFORMATION

INTRODUCTION

Turn signal and hazard warning systems are standard factory-installed equipment on this model. Refer to 8W-52 - Turn Signals in Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

TURN SIGNAL SYSTEM

With the ignition switch in the On or Accessory 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, and rear tail/stop/turn signal lamp bulbs will flash.

Following are general descriptions of the major components in the turn signal system. Refer to the owner's manual in the vehicle glove box for more information on the features, use and operation of the turn signal system.

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. Push the switch button in to activate the hazard warning system, and push in on the button again to turn the system off. When the hazard warning system is activated, the right and left turn signal indicators, front park/turn signal lamps, and rear tail/stop/turn signal lamps will flash.

Following are general descriptions of the major components in the hazard warning system. Refer to the owner's manual in the vehicle glove box for more information on the features, use and operation of the hazard warning system.

DESCRIPTION AND OPERATION

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.

## DESCRIPTION AND OPERATION (Continued)

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 Positive-Negative-Positive (PNP) transistor at a pre-calibrated flash rate or frequency. Each time the PNP transistor energizes the hazard warning circuit, the pin 6 "hazard on sense" voltage will become high and the IC signals the PNP transistor to de-energize the circuit. This cycling will continue until the hazard warning switch is turned off.

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.

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.

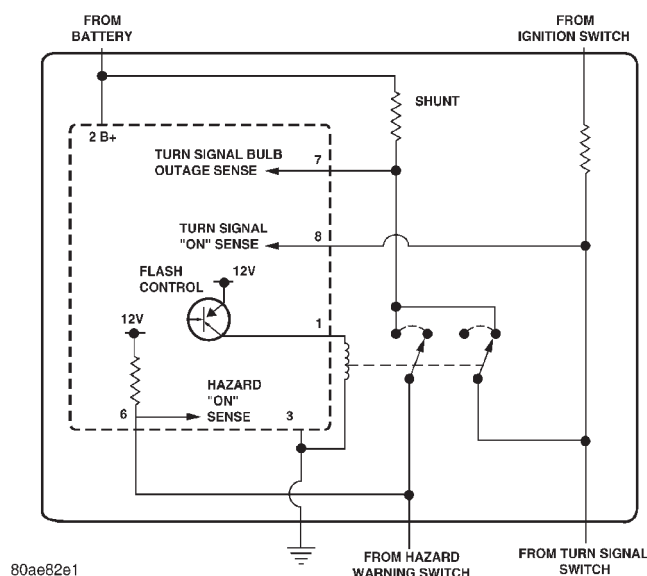
Because of the active electronic elements within the combination flasher, it cannot be tested with conventional automotive electrical test equipment. If the combination flasher is believed to be faulty, test the turn signal and hazard warning system circuits as described in this group. Then replace the 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 contained in the multi-function switch assembly (Fig. 2). The multi-function switch assembly is secured to the left side of the steering column. A switch stalk that extends from the left side of the steering column is moved up or down to activate the right or left turn signals, respectively. A latching push-button that extends upward from the multi-function switch and through the top of the upper steering column shroud is used to control the hazard warning system.

The multi-function switch contains circuitry for the following functions:

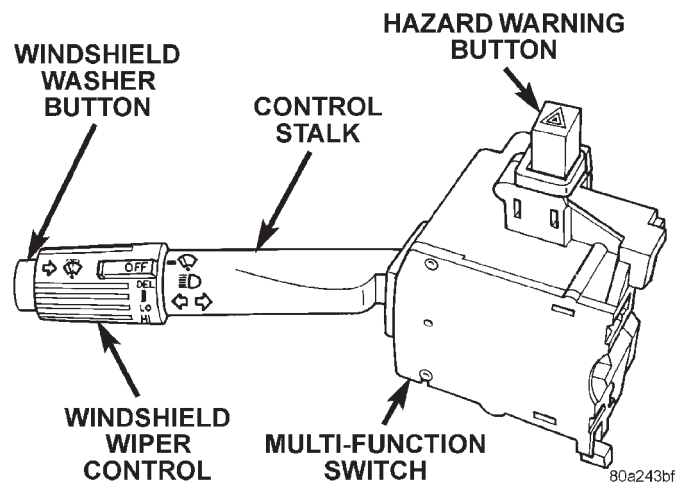


**Fig. 1 Combination Flasher - Typical**

## DESCRIPTION AND OPERATION (Continued)

- Turn signals
- Hazard warning
- Headlamp beam selection
- Headlamp optical horn
- Windshield wipers
- Windshield washers.

The information contained in this group addresses only the switch functions for the turn signal and hazard warning systems. 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-function switch is faulty, or if the switch is damaged, the entire switch assembly must be replaced.



*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. Refer to Turn Signal Indicator Lamp in Group 8E - Instrument Panel Systems for diagnosis or service of these lamps.

## TURN SIGNAL LAMP

The exterior lamps in the turn signal and hazard warning circuits include the front park/turn signal, and the rear tail/stop/turn signal. Refer to Exterior Lamps in Group 8L - Lamps for diagnosis and service of the turn signal 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.**

## TURN SIGNAL AND HAZARD WARNING SYSTEMS

For circuit descriptions and diagrams, refer to 8W-52 - Turn Signals in Group 8W - Wiring Diagrams.

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(1) Turn the ignition switch to the On position. Actuate the turn signal lever or the 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 junction block 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 junction block; 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 the junction block 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, dis-

## DIAGNOSIS AND TESTING (Continued)

card 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 fused ignition switch output circuit cavity for the combination flasher in the junction block. If OK, go to Step 6. If not OK, repair the open circuit to the turn signal fuse as required.

(6) Turn the ignition switch to the Off position. Check for battery voltage at the fused B(+) circuit cavity for the combination flasher in the junction block. If OK, go to Step 7. If not OK, repair the open circuit to the hazard warning fuse as required.

(7) Disconnect and isolate the battery negative cable. Check for continuity between the ground circuit cavity for the combination flasher in the junction block 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 hazard signal circuit cavities in the junction block 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 turn signal circuit cavities in the junction block 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

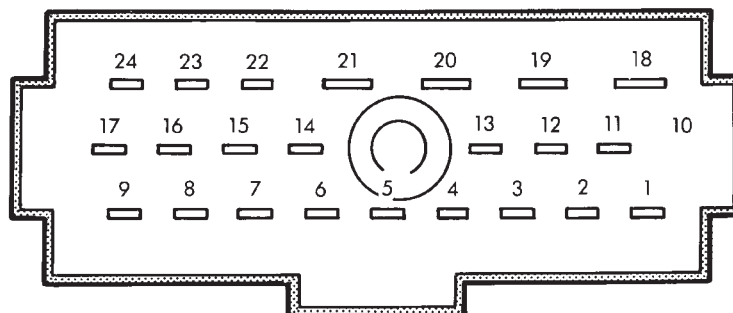
Perform the diagnosis of the hazard warning and/or turn signal systems as described in this group before testing the multi-function switch. For circuit descriptions and diagrams, refer to 8W-52 - Turn Signals in Group 8W - Wiring Diagrams.

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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.



VIEW FROM TERMINAL CASE

SWITCH POSITIONS		CONTINUITY BETWEEN
TURN SIGNAL	HAZARD WARNING	
NEUTRAL	OFF	12 AND 14 AND 15
LEFT	OFF	15 AND 16 AND 17
LEFT	OFF	12 AND 14
LEFT	OFF	22 AND 23 WITH OPTIONAL CORNER LAMPS
RIGHT	OFF	11 AND 12 AND 17
RIGHT	OFF	14 AND 15
RIGHT	OFF	23 AND 24 WITH OPTIONAL CORNER LAMPS
NEUTRAL	ON	11 AND 12 AND 13 AND 15 AND 16

Fig. 3 Multi-Function Switch Continuity

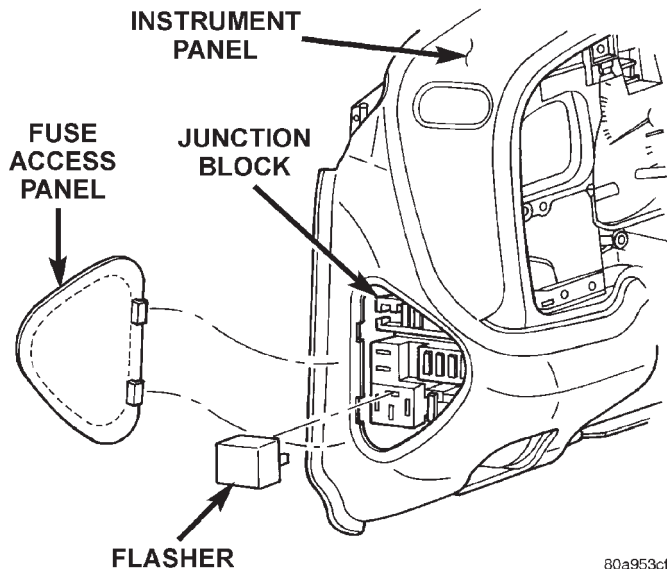


## REMOVAL AND INSTALLATION

### COMBINATION FLASHER

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- (1) Disconnect and isolate the battery negative cable.
- (2) Remove the fuse access panel by unsnapping it from the left end of the instrument panel.
- (3) Unplug the combination flasher from the junction block (Fig. 4).



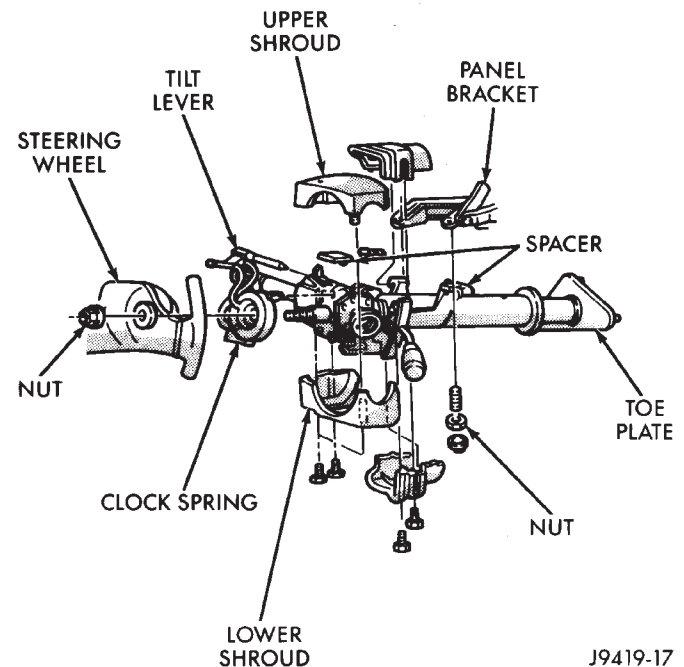
**Fig. 4 Combination Flasher Remove/Install**

- (4) Install the combination flasher by aligning the flasher terminals with the cavities in the junction block and pushing the flasher firmly into place.
- (5) Connect the battery negative cable.
- (6) Test the flasher operation.
- (7) Reinstall the fuse access panel.

### MULTI-FUNCTION SWITCH

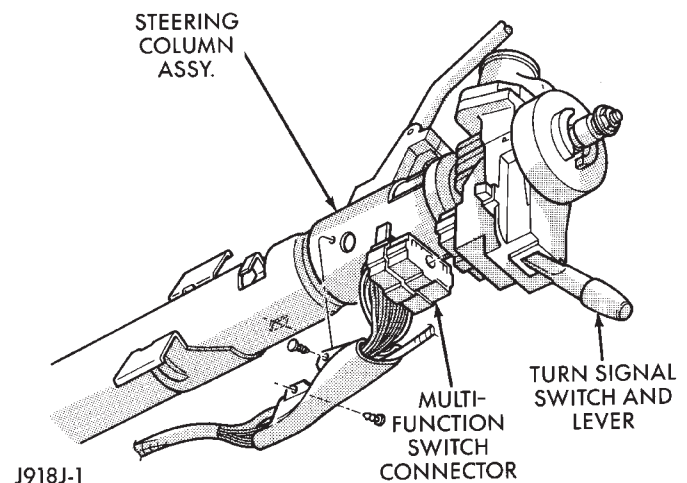
**WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL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

- (1) Disconnect and isolate the battery negative cable.
- (2) If the vehicle is so equipped, remove the tilt steering column lever.
- (3) Remove both the upper and lower shrouds from the steering column (Fig. 5).



**Fig. 5 Steering Column Shrouds Remove/Install - Typical**

- (4) Remove the lower fixed column shroud.
- (5) Move the upper fixed column shroud far enough to access the rear of the multi-function switch (Fig. 6).



**Fig. 6 Multi-Function Switch Connector - Typical**

- (6) Remove the tamper proof mounting screws (a Snap On tamper proof torx bit TTXR20B2 or equivalent).

## REMOVAL AND INSTALLATION (Continued)

lent is required) that secure the multi-function switch to the steering column.

(7) Gently pull the switch away from the steering column far enough to access and remove the multi-function switch wire harness connector screw.

(8) Unplug the wire harness connector from the multi-function switch.

(9) Reverse the removal procedures to install. Tighten the fasteners as follows:

- Multi-function switch wire harness connector screw - 2 N·m (17 in. lbs.)
- Multi-function switch mounting screws - 2 N·m (17 in. lbs.).