TURN SIGNAL AND HAZARD WARNING SYSTEMS

TABLE OF CONTENTS

page

DESCRIPTION AND OPERATION
- TURN SIGNAL SYSTEM 1
- HAZARD WARNING SYSTEM 2
- TURN SIGNAL SWITCH AND HAZARD WARNING SWITCH 3
- TURN SIGNAL CANCELLING CAM 4
- COMBINATION FLASHER 4

DIAGNOSIS AND TESTING
- TURN SIGNAL AND HAZARD WARNING SYSTEMS 6

page

- TURN SIGNAL AND HAZARD WARNING SWITCH 7

REMOVAL AND INSTALLATION
- COMBINATION FLASHER 9
- TURN SIGNAL AND HAZARD WARNING SWITCH 9
- TURN SIGNAL CANCELLING CAM 10

SPECIAL TOOLS
- TURN SIGNAL AND HAZARD WARNING SYSTEMS 13

DESCRIPTION AND OPERATION

TURN SIGNAL SYSTEM

DESCRIPTION

A turn signal system is standard factory-installed safety equipment on this model. The turn signal system allows the vehicle operator to provide the drivers of other vehicles in near proximity with an optical indication of his intention to perform a turning maneuver or to change traffic lanes. The turn signal system uses ignition switched battery current, and will operate only when the ignition switch is in the On position.

Vehicles equipped with the optional Electronic Vehicle Information Center (EVIC) have a Turn Signal On warning feature. This feature is designed to provide the driver with both visual and audible reminders when a turn signal has been left turned on for an extended period. Refer to **Electronic Vehicle Information Center** in the Description and Operation section of Group 8V - Overhead Console Systems for more information on the EVIC features.

The turn signal system includes the following components:

- Combination flasher
- Front side marker lamps
- Turn signal cancelling cam
- Turn signal indicator lamps
- Turn signal lamps
- Turn signal switch.

Refer to **Lamp** in the proper section of Group 8L - Lamps for more information on the exterior turn signal lamps. Refer to **Instrument Cluster** in the proper section of Group 8E - Instrument Panel Systems for more information on the turn signal indicator lamps. Following are general descriptions of the major components in the turn signal system. For complete circuit diagrams, refer to **Turn Signals** in the Contents of Group 8W - Wiring Diagrams.

OPERATION

With the ignition switch in the On or Accessory position, and the turn signal (left or lighting multifunction) switch control stalk moved up (right turn) or down (left turn), the turn signal system is activated. When the turn signal system is activated, the circuitry of the turn signal switch and the combination flasher will cause the selected (right or left) turn signal indicator lamp, front park/turn signal lamp, front side marker lamp, and rear turn signal lamp to flash on and off. If the exterior lighting is turned off, the front park/turn signal lamp and the front side marker lamp will flash in unison. If the exterior lighting is turned on, the front park/turn signal lamp and the front side marker lamp will flash alternately.

The EVIC module uses turn signal status messages from the Electro-Mechanical Instrument Cluster (EMIC) module and distance messages from the Powertrain Control Module (PCM) received over the Programmable Communications Interface (PCI) data bus network to determine when the Turn Signal On warning should be activated. The EMIC receives a hard wired input from the combination flasher to determine the proper turn signal status message to send. If a turn signal is left on for more than about 1.6 kilometers (1 mile) of driving distance, the EVIC will display the Turn Signal On message and will send a request to the Body Control Module (BCM) over the PCI data bus for two sets of three chime tones to sound.

DESCRIPTION AND OPERATION (Continued)

See 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

DESCRIPTION

A hazard warning system is standard factory-installed safety equipment on this model. The hazard warning system allows the vehicle operator to provide the drivers of other vehicles in near proximity an optical indication that the vehicle is disabled or is an obstacle to traffic flow. Unlike the turn signal system, the hazard warning system uses a non-switched source of battery current so that the system will operate regardless of the ignition switch position.

The hazard warning system can also be activated by the Body Control Module (BCM). The BCM is programmed to activate the hazard warning system lamps in order to provide the following features:

- Remote Keyless Entry (RKE) system lock and unlock request optical verification (customer programmable)
- RKE system panic mode optical alert
- Vehicle Theft Security System (VTSS) optical alarm.

This vehicle also offers several customer programmable features, which allows the selection of several optional electronic features to suit individual preferences. Refer to **ELECTRONIC VEHICLE INFORMATION CENTER PROGRAMMING** in the Service Procedures section of Group 8V - Overhead Console Systems for more information on the customer programmable feature options. Customer programmable feature options affecting the hazard warning system include:

- **Flash Lights with Lock** - Allows the option of having the lights flash as an optical verification that the RKE system received a valid Lock request or Unlock request from the RKE transmitter, or having no optical verification.

The hazard warning system includes the following components:

- Combination flasher
- Front side marker lamps
- Hazard warning switch
- Turn signal indicator lamps
- Turn signal lamps.

Certain functions and features of the horn system rely upon resources shared with other electronic modules in the vehicle over the Programmable Communications Interface (PCI) data bus network. The PCI data bus network allows the sharing of sensor information. This helps to reduce wire harness complexity, internal controller hardware, and component sensor current loads. At the same time, this system provides increased reliability, enhanced diagnostics, and allows the addition of many new feature capabilities. For diagnosis of these electronic modules or of the PCI data bus network, the use of a DRB scan tool and the proper Diagnostic Procedures manual are recommended.

The other electronic modules that may affect hazard warning system operation are as follows:

- **Body Control Module (BCM)** - Refer to **Body Control Module** in the Description and Operation section of Group 8E - Instrument Panel Systems for more information.
- **Electronic Vehicle Information Center (EVIC)** - Refer to **Electronic Vehicle Information Center** in the Description and Operation section of Group 8V - Overhead Console Systems for more information.

Refer to **Lamp** in the proper section of Group 8L - Lamps for more information on the exterior turn signal lamps. Refer to **Instrument Cluster** in the proper section of Group 8E - Instrument Panel Systems for more information on the turn signal indicator lamps. Following are general descriptions of the major components in the hazard warning system. For complete circuit diagrams, refer to **Turn Signals** in the Contents of Group 8W - Wiring Diagrams.

OPERATION

With the hazard warning switch in the On position, the hazard warning system is activated. When the hazard warning system is activated, the circuitry of the hazard warning switch and the combination flasher will cause both the right side and the left side turn signal indicator lamps, front park/turn signal lamps, front side marker lamps and rear turn signal lamps to flash on and off. If the exterior lamps are turned off, the front park/turn signal lamps and the front side marker lamps will flash in unison. If the exterior lamps are turned on, the front park/turn signal lamps and the front side marker lamps will flash alternately.

The BCM can also activate the hazard warning system lamps by energizing the electronic combination flasher through a single hard wired output circuit. The BCM energizes and de-energizes the combination flasher in response to internal programming as well as message inputs received over the Programmable Communications Interface (PCI) data bus network. The BCM can energize the combination flasher for a single flash (RKE lock request), several flashes (RKE unlock request), or for extended operation (RKE panic mode and VTSS alarm mode).

See 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 (Continued)

TURN SIGNAL SWITCH AND HAZARD WARNING SWITCH

DESCRIPTION

The turn signal and hazard warning switches are integral to the left (lighting) multi-function switch unit, which is secured to the left side of the multi-function switch mounting housing at the top of the steering column (Fig. 1). The only visible parts of the left multi-function switch are the control stalk that extends from the left side of the steering column, and the hazard warning switch push button that protrudes from the top of the steering column. The left multi-function switch control stalk has both nomenclature and international control symbols on it, which identify its many functions. The hazard warning switch push button is identified with a double triangle, which is the international control symbol for hazard warning. The remainder of the left multi-function switch is concealed beneath the steering column shrouds.

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

- Exterior lighting control, including:
- Fog lamps
- Park lamps
- Headlamps
- Auto headlamps (if equipped)
- Headlamp beam selection
- Headlamp optical horn.
- Interior lighting control, including:
- Interior lamps defeat
- Interior lamps on
- Panel lamps dimming.

The information contained in this group addresses only the left multi-function switch turn signal and hazard warning functions. For information relative to the other systems that are controlled by and circuits that are integral to the left multi-function switch, see the group in this service manual that covers that system. However, the turn signal and hazard warning switches cannot be repaired. If these switches or any other circuit or component of the left multi-function switch unit is faulty or damaged, the entire left multi-function switch unit must be replaced.

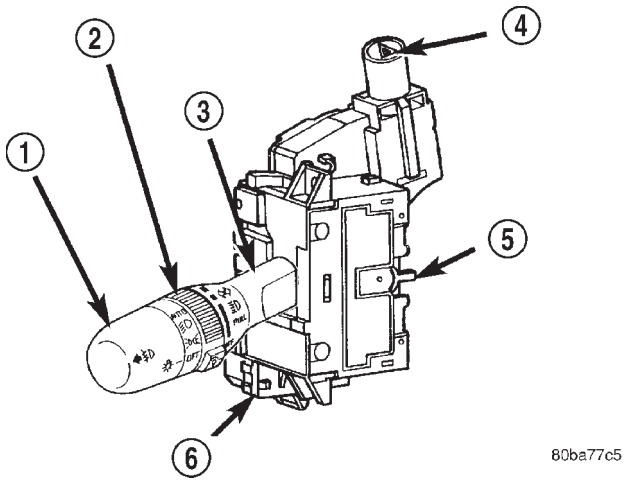


Fig. 1 Left (Lighting) Multi-Function Switch

1 – EXTERIOR LIGHTING CONTROL
2 – INTERIOR LIGHTING CONTROL
3 – CONTROL STALK
4 – HAZARD WARNING BUTTON
5 – CANCEL ACTUATOR
6 – LEFT (LIGHTING) MULTI-FUNCTION SWITCH

OPERATION

TURN SIGNAL SWITCH

The left multi-function switch control stalk that extends from the left side of the steering column just below the steering wheel is moved up or down to activate the turn signal switch. When the control stalk is moved in the upward direction, the right turn signal switch circuitry is activated; and, when the control stalk is moved in the downward direction, the left turn signal switch circuitry is activated. The turn signal 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 left multi-function switch control stalk is released.

When the turn signal switch is in a detent position, it is turned off by one of two lobes of the turn signal cancelling cam, which is located beneath the clockspring mechanism within the multi-function switch mounting housing on the steering column. Turning the steering wheel causes the turn signal cancelling cam lobes to contact a cancel actuator in the left multi-function switch, and the turn signal switch automatically returns to the off position.

HAZARD WARNING SWITCH

The hazard warning switch is controlled by the hazard warning switch push button. Push the switch button in to unlatch the switch and activate the hazard warning system, and push in on the button again to latch the switch and turn the system off. When the hazard warning switch is latched (hazard warning off), the push button will be in a lowered position on the top of the steering column shroud; and, when the hazard warning switch is unlatched (hazard warning on), the push button will be in a raised position.

DESCRIPTION AND OPERATION (Continued)

TURN SIGNAL CANCELLING CAM

DESCRIPTION

The turn signal cancelling cam is concealed within the multi-function switch mounting housing on the top of the steering column below the steering wheel and the clockspring mechanism. The turn signal cancelling cam consists of a molded plastic hub and disc unit with two integral lobes. The upper lobe of the turn signal cancelling cam has a hole that is used to align it with another hole in the back of the multi-function switch mounting housing. The inside diameter of the turn signal cancelling cam hub has an integral metal-reinforced plastic key that locks the unit to a keyway in the upper steering column shaft.

The upper surface of the turn signal cancelling cam features three holes, two round and one oblong. These holes engage and key the cam unit to three matching pins in the hub of the clockspring mechanism. The hub of the clockspring and the turn signal cancelling cam lobes rotate with the steering wheel. The centered clockspring housing is then secured to the multi-function switch mounting housing over the top of the turn signal cancelling cam. The multi-function switch mounting housing is secured to the steering column and remains stationary.

The turn signal cancelling cam is serviced as a unit with the multi-function switch mounting housing. The turn signal cancelling cam cannot be repaired and, if faulty or damaged, the multi-function switch mounting housing unit must be replaced. Refer to **Clockspring** in the Removal and Installation section of Group 8M - Passive Restraint Systems for the clockspring service procedures.

OPERATION

The turn signal cancelling cam has two lobes molded into it. When the turn signals are activated by moving the left multi-function switch control stalk to a detent position, a turn signal cancel actuator is extended from the inside surface of the multi-function switch housing toward the turn signal cancelling cam. When the steering wheel is rotated during a turning maneuver, one of the two turn signal cancelling cam lobes will contact the turn signal cancel actuator, releasing the left multi-function switch control stalk from its detent and cancelling the turn signal event.

COMBINATION FLASHER

DESCRIPTION

The combination flasher is a smart relay that functions as both the turn signal system and the 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.

The combination flasher is located in the junction block, under the left end of the instrument panel in the passenger compartment. 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 system 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 or adjusted and, if faulty or damaged, it must be replaced. Refer to **Turn Signals** in the Contents of Group 8W - Wiring Diagrams for complete circuit diagrams.

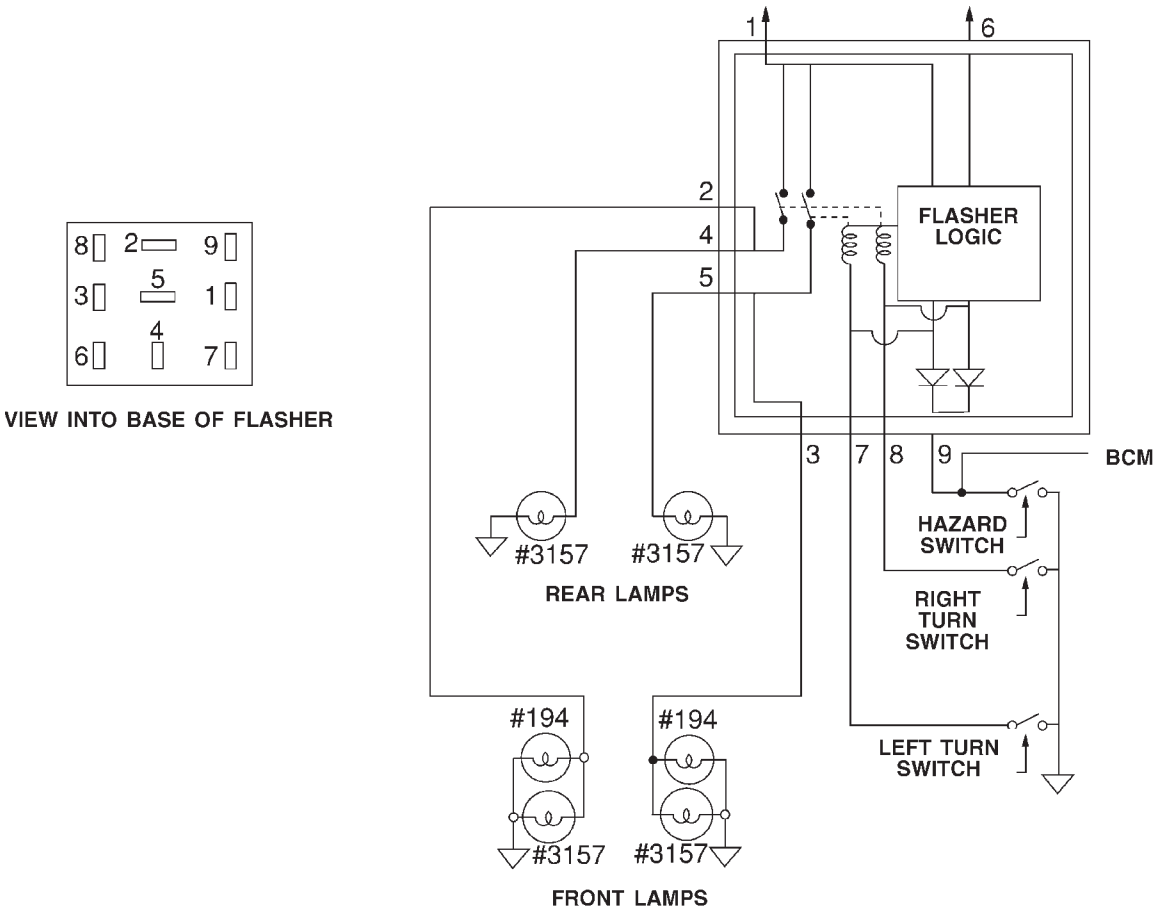
OPERATION

The combination flasher has nine blade-type terminals intended for the following inputs and outputs: fused B(+), fused ignition switch output, left turn switch sense, right turn switch sense, hazard switch sense, left front turn signal circuit, right front turn signal circuit, left rear turn signal circuit and right rear turn signal circuit. Constant battery voltage is 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. However, when the flasher is idle no current is drawn through the module. The unit does not become active until it is provided a signal ground from the turn signal switch, hazard warning switch or the Body Control Module (BCM).

The IC within the combination flasher (Fig. 2) contains the logic that controls the flasher operation and the flash rate. Typical flash rate is about ninety flashes per minute. When a bulb is burnt out, or when a circuit for a lamp is open, the turn signal flash rate will increase to a minimum of 180 flashes per minute. However, an open lamp circuit or burnt out bulb does not change the hazard warning flash rate.

Turn signal inputs that actuate the combination flasher are low current grounds, each drawing a maximum of 300 milliamperes. The turn signal inputs are provided to the flasher through the junction block by the turn signal (left multi-function) switch on the steering column. The hazard warning signal input is a low current ground drawing a maximum of 600 milliamperes. The hazard warning input can be provided through the junction block by

DESCRIPTION AND OPERATION (Continued)



COMBINATION FLASHER CIRCUITS		
CAVITY	**CIRCUIT**	**FUNCTION**
1	L25	Fused B(+)
2	L61	Left Front Turn Signal
3	L60	Right Front Turn Signal
4	L63	Left Rear Turn Signal
5	L62	Right Rear Turn Signal
6	F22	Fused Ignition Switch Output
7	L305	Left Turn Switch Sense
8	L302	Right Turn Switch Sense
9	L91	Hazard Switch Sense

Fig. 2 Combination Flasher

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DESCRIPTION AND OPERATION (Continued)

the hazard warning (left multi-function) switch on the steering column, or by the BCM on the back of the junction block.

DIAGNOSIS AND TESTING

TURN SIGNAL AND HAZARD WARNING SYSTEMS

For complete circuit diagrams, refer to **Turn Signals** in the Contents of Group 8W - Wiring Diagrams.

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) Turn the ignition switch to the On position. Activate the turn signal switch by moving the left multi-function switch control stalk up (right turn) and/or down (left turn). 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 system 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 fused B(+) fuse in the junction block. If OK, go to Step 3. If not OK, repair the shorted circuit or component as required and replace the faulty fuse(s).

(3) Check for battery voltage at the fused B(+) fuse in the junction block. If OK, go to Step 4. If not OK, repair the open fused B(+) circuit to the Power Distribution Center (PDC) fuse as required.

(4) Check the fused ignition switch output (run) fuse in the junction block. If OK, go to Step 5. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(5) Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run) fuse in the junction block. If OK, go to Step 6. If not OK, repair the open fused ignition switch (run) circuit to the ignition switch as required.

(6) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove 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, discard the faulty combination flasher. If not OK, remove the test flasher and go to Step 7.

(7) Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run) circuit cavity for the combination flasher in the junction block. If OK, go to Step 8. If not OK, repair the open fused ignition switch output (run) circuit to the junction block fuse as required.

(8) 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 9. If not OK, repair the open fused B(+) circuit to the junction block fuse as required.

(9) Disconnect and isolate the battery negative cable. Disconnect the instrument panel wire harness connector from the turn signal and hazard warning (left multi-function) switch connector receptacle. Check for continuity between the ground circuit cavity of the instrument panel wire harness connector for the left multi-function switch and a good ground. There should be continuity. If OK, go to Step 10. If not OK, repair the open ground circuit to ground as required.

(10) Check for continuity between the hazard switch sense circuit cavity of the instrument panel wire harness connector for the left multi-function switch and a good ground. There should be no continuity. If OK, go to Step 11. If not OK, repair the shorted hazard switch sense circuit as required.

(11) Check for continuity between the hazard switch sense circuit cavities of the junction block for the combination flasher and the instrument panel wire harness connector for the left multi-function switch. There should be continuity. If OK, go to Step 12. If not OK, repair the open hazard switch sense circuit as required.

(12) Check for continuity between the left turn switch sense circuit cavity of the instrument panel wire harness connector for the left multi-function switch and a good ground. There should be no continuity. If OK, go to Step 13. If not OK, repair the shorted left turn switch sense circuit as required.

(13) Check for continuity between the left turn switch sense circuit cavities of the junction block for the combination flasher and the instrument panel wire harness connector for the left multi-function switch. There should be continuity. If OK, go to Step 14. If not OK, repair the open left turn switch sense circuit as required.

(14) Check for continuity between the right turn switch sense circuit cavity of the instrument panel wire harness connector for the left multi-function switch and a good ground. There should be no continuity. If OK, go to Step 15. If not OK, repair the shorted right turn switch sense circuit as required.

DIAGNOSIS AND TESTING (Continued)

(15) Check for continuity between the right turn switch sense circuit cavities of the junction block for the combination flasher and the instrument panel wire harness connector for the left multi-function switch. There should be continuity. If OK, refer to **Turn Signal and Hazard Warning Switch** in the Diagnosis and Testing section of this group to test the left multi-function switch. If not OK, repair the open right turn switch sense circuit as required.

TURN SIGNAL AND HAZARD WARNING SWITCH

The turn signal and hazard warning switches are integral to the left multi-function switch. Refer to **Turn Signal and Hazard Warning Systems** in the Diagnosis and Testing section of this group before testing the left multi-function switch. For complete circuit diagrams, refer to **Turn Signals** in the Contents of Group 8W - Wiring Diagrams.

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.

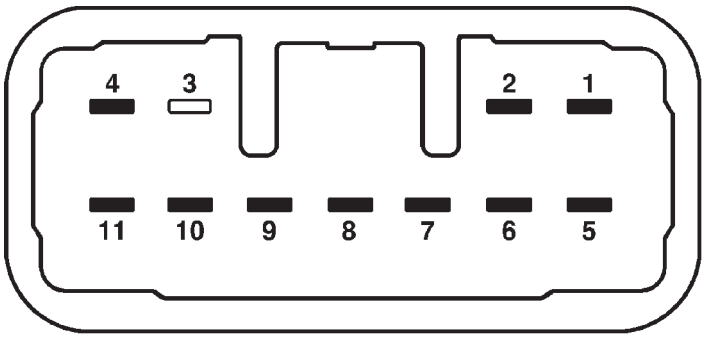
(1) Disconnect and isolate the battery negative cable.

(2) Disconnect the instrument panel wire harness connector from the left multi-function switch connector receptacle.

(3) Using an ohmmeter, perform the continuity and resistance tests at the terminals in the switch connector receptacle as shown in the Left Multi-Function Switch Test chart (Fig. 3).

(4) If the left multi-function switch fails any of the continuity or resistance tests, replace the faulty left multi-function switch unit as required.

DIAGNOSIS AND TESTING (Continued)



LEFT (LIGHTING) MULTI-FUNCTION SWITCH			
TURN SIGNAL AND HAZARD WARNING SWITCH TESTS			
SWITCH POSITION		CONTINUITY BETWEEN	
TURN	HAZARD		
Neutral	Off	No Related Continuity	
Left	Off	Pins 2 & 8	
Right	Off	Pins 2 & 7	
Neutral	On	Pins 2 & 9	
EXTERIOR LIGHTING SWITCH TESTS			
SWITCH POSITION	CONTINUITY BETWEEN	RESISTANCE BETWEEN	RESISTANCE RANGE (OHMS)
Off	—	Pins 4 & 11	3743 - 3824
Park Lamps On	—	Pins 4 & 11	901 - 926
Head Lamps On	—	Pins 4 & 11	345 - 358
Auto Headlamps On	—	Pins 4 & 11	74 - 81
Fog Lamps	Pins 1 & 2	—	—
Optical Horn	Pins 2 & 5	—	—
High Beam	Pins 2 & 6	—	—
INTERIOR LIGHTING SWITCH TESETS			
Dome Lamp Disable On	—	Pins 4 & 9	63 - 70
Panel Lamps Dimming Position 1	—	Pins 4 & 9	198 - 208
Dimming Position 2	—	Pins 4 & 9	551 - 569
Dimming Position 3	—	Pins 4 & 9	905 - 929
Dimming Position 4	—	Pins 4 & 9	1258 - 1290
Dimming Position 5	—	Pins 4 & 9	1611 - 1651
Dimming Position 6	—	Pins 4 & 9	1965 - 2011
Parade Mode On	—	Pins 4 & 9	3534 - 3611
Dome Lamp Enable On	—	Pins 4 & 9	7811 - 7974

Fig. 3 Left Multi-Function Switch Test

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REMOVAL AND INSTALLATION

COMBINATION FLASHER

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.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the steering column opening cover from the instrument panel. Refer to **Steering Column Opening Cover** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(3) Remove the combination flasher from the junction block (Fig. 4).

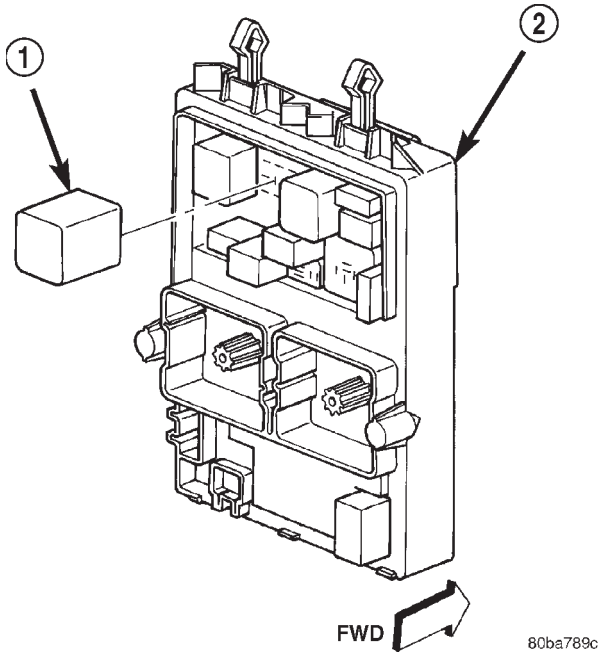


Fig. 4 Combination Flasher

1 – COMBINATION FLASHER
2 – JUNCTION BLOCK

INSTALLATION

(1) Position the combination flasher in the proper receptacle in the junction block.

(2) Align the combination flasher terminals with the terminal cavities in the junction block receptacle.

(3) Push in firmly on the combination flasher until the terminals are fully seated in the terminal cavities in the junction block receptacle.

(4) Install the steering column opening cover onto the instrument panel. Refer to **Steering Column Opening Cover** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the procedures.

(5) Reconnect the battery negative cable.

TURN SIGNAL AND HAZARD WARNING 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.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the screw that secures the lower tilting steering column shroud to the steering column multifunction switch mounting housing (Fig. 5).

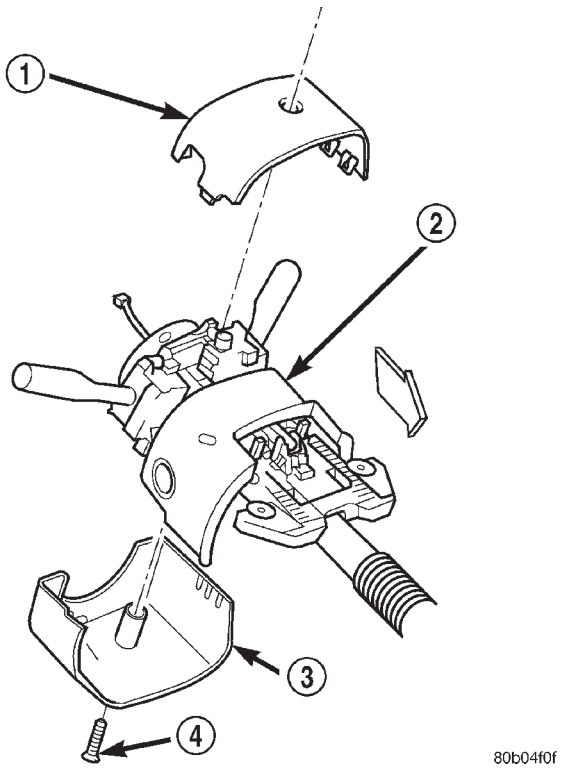


Fig. 5 Steering Column Shrouds Remove/Install

1 – UPPER TILTING COLUMN SHROUD
2 – FIXED COLUMN SHROUD
3 – LOWER TILTING COLUMN SHROUD
4 – SCREW

REMOVAL AND INSTALLATION (Continued)

(3) Unsnap the two halves of the tilting steering column shroud from each other and remove both halves from the steering column.

(4) Disconnect the instrument panel wire harness connector from the turn signal and hazard warning (left multi-function) switch connector receptacle.

(5) Remove the two screws that secure the left multi-function switch to the multi-function switch mounting housing (Fig. 6).

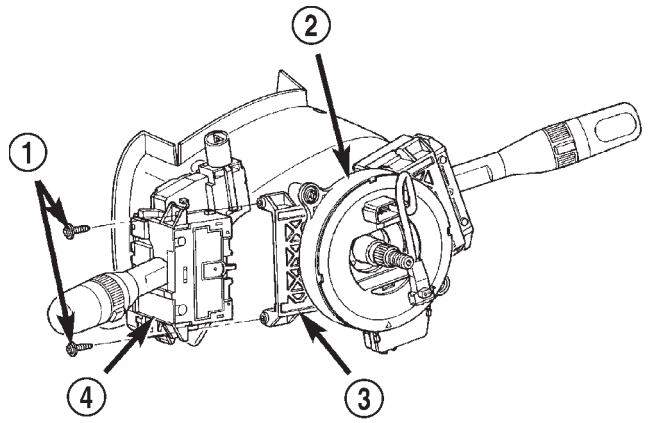


Fig. 6 Left Multi-Function Switch Remove/Install

1 – SCREW (2)
2 – STEERING COLUMN
3 – MULTI-FUNCTION SWITCH MOUNTING HOUSING
4 – LEFT MULTI-FUNCTION SWITCH

(6) Remove the left multi-function switch from the multi-function switch mounting housing.

INSTALLATION

(1) Position the left multi-function switch onto the multi-function switch mounting housing.

(2) Install and tighten the two screws that secure the left multi-function switch to the multi-function switch mounting housing. Tighten the screws to 2.5 N·m (22 in. lbs.).

(3) Reconnect the instrument panel wire harness connector to the left multi-function switch connector receptacle.

(4) Position the lower tilting steering column shroud to the underside of the steering column.

(5) Install and tighten the screw that secures the lower tilting steering column shroud to the multi-function switch mounting housing. Tighten the screw to 1.9 N·m (17 in. lbs.).

(6) Position the upper tilting column shroud over the steering column with the hazard warning switch button inserted through the hole in the upper surface of the shroud. Align the upper tilting steering column shroud to the lower shroud and snap the two shroud halves together.

(7) Reconnect the battery negative cable.

TURN SIGNAL CANCELLING CAM

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.

REMOVAL

NOTE: Before starting this procedure, be certain to turn the steering wheel until the front wheels are in the straight-ahead position.

(1) Place the front wheels in the straight-ahead position.

(2) Remove the driver side airbag module from the steering wheel. Refer to **Driver Side Airbag Module** in the Removal and Installation section of Group 8M - Passive Restraint Systems for the procedures.

(3) Disconnect the steering wheel wire harness connector from the upper clockspring connector receptacle, which is located between the two upper spokes of the armature within the hub cavity of the steering wheel.

(4) Remove the nut that secures the steering wheel armature to the steering column upper shaft, which is located within the hub cavity of the steering wheel.

(5) Pull the steering wheel off of the steering column upper shaft spline using a two-jawed puller (Special Tool C-3894-A) (Fig. 7). When installing the puller onto the steering wheel, be certain that each jaw of the puller is seated in the pocket that is cast into the underside of the steering wheel armature on each side of the hub (Fig. 8). Also, if the clockspring is to be reused, be certain not to damage or deform the clockspring case when positioning the jaws of the puller below the steering wheel armature hub.

(6) Remove the screw that secures the lower tilting steering column shroud to the steering column multi-function switch mounting housing (Fig. 9).

(7) Unsnap the two halves of the tilting steering column shroud from each other and remove both halves from the steering column.

(8) Disconnect the instrument panel wire harness connectors from the lower clockspring connector receptacles, the right multi-function switch connector receptacle and the left multi-function switch connector receptacle.

(9) From the underside of the steering column, remove the one screw that secures the multi-function switch mounting housing to the top of the column housing (Fig. 10).

REMOVAL AND INSTALLATION (Continued)

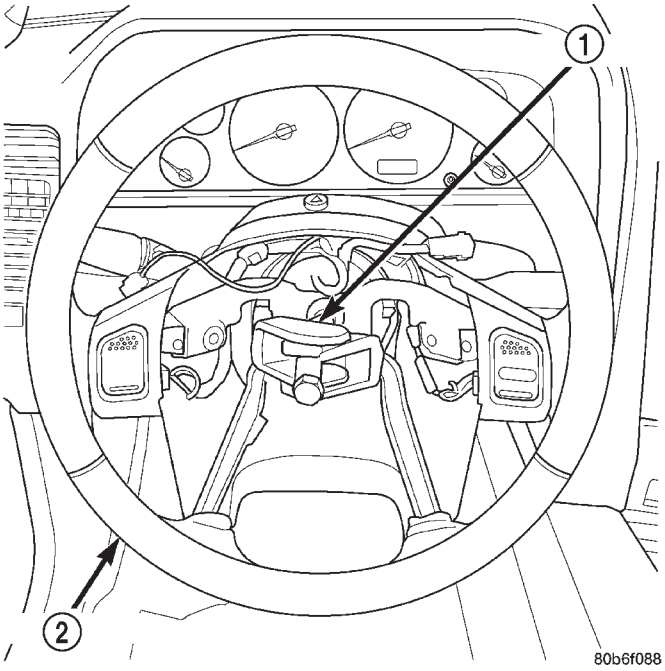


Fig. 7 Steering Wheel Remove/Install

1 – PULLER
2 – STEERING WHEEL

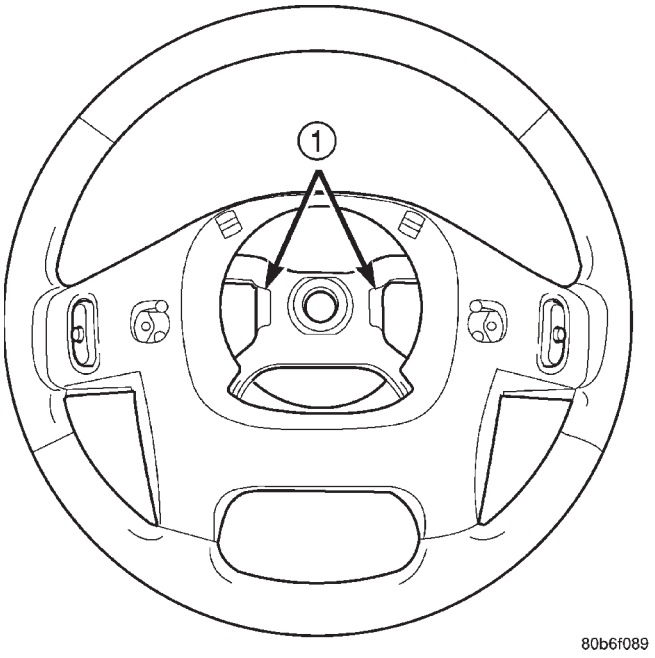


Fig. 8 Steering Wheel Armature Pockets

1 – STEERING WHEEL POCKETS

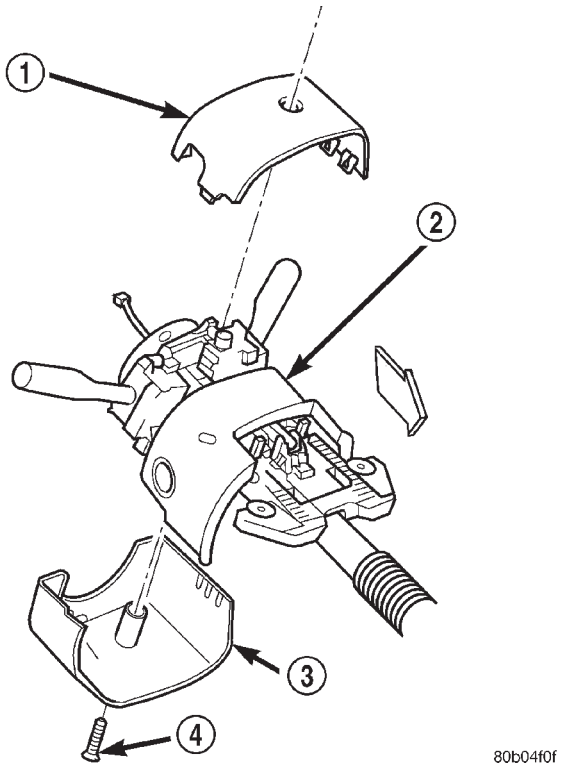


Fig. 9 Steering Column Shrouds Remove/Install

1 – UPPER TILTING COLUMN SHROUD
2 – FIXED COLUMN SHROUD
3 – LOWER TILTING COLUMN SHROUD
4 – SCREW

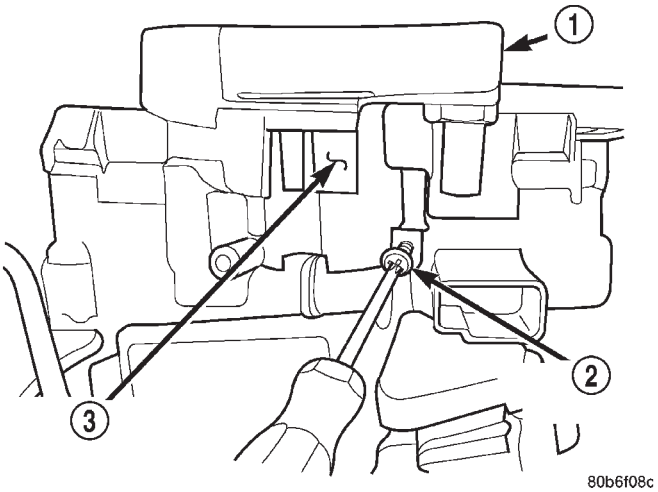


Fig. 10 Multi-Function Switch Mounting Housing Screw Remove/Install

1 – CLOCK SPRING
2 – MOUNTING SCREW
3 – MULTIFUNCTION SWITCH ASSEMBLY

REMOVAL AND INSTALLATION (Continued)

(10) Pull the multi-function switch mounting housing, the clockspring and both multi-function switches from the top of the steering column as a unit (Fig. 11).

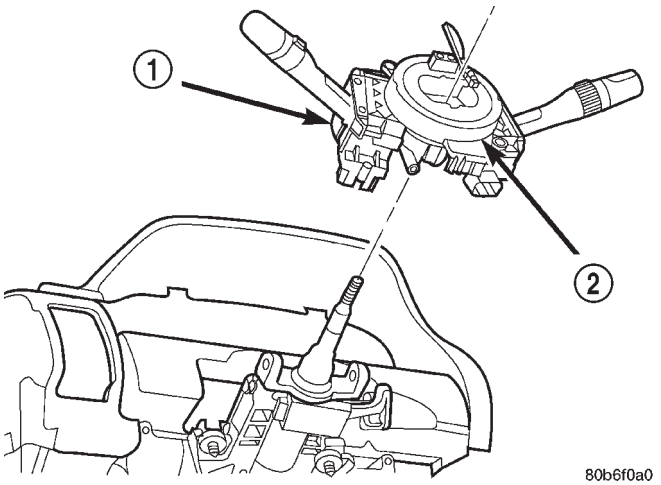


Fig. 11 Multi-Function Switch Mounting Housing Remove/install

1 – MULTIFUNCTION SWITCH
2 – CLOCK SPRING

(11) Remove the two screws that secure the clockspring case to the multi-function switch mounting housing (Fig. 12).

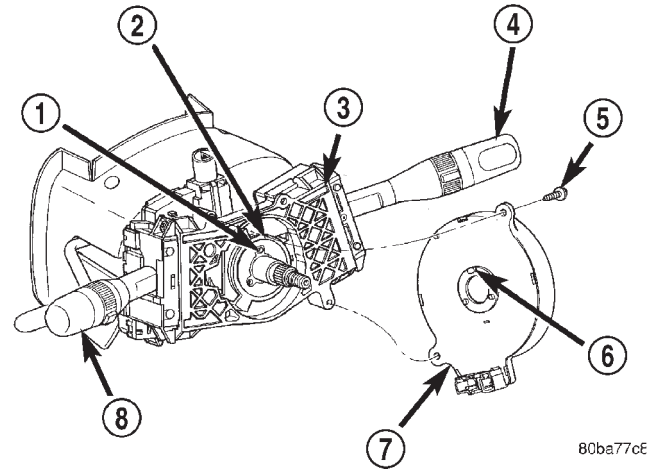


Fig. 12 Clockspring Remove/Install

1 – OBLONG HOLE
2 – TURN SIGNAL CANCELLING CAM
3 – MULTI-FUNCTION SWITCH MOUNTING HOUSING
4 – RIGHT MULTI-FUNCTION SWITCH
5 – SCREW (2)
6 – OBLONG PIN
7 – CLOCKSPRING
8 – LEFT MULTI-FUNCTION SWITCH

(12) Remove the clockspring from the multi-function switch mounting housing.

(13) Remove the turn signal and hazard warning switch from the multi-function switch mounting housing. Refer to **Turn Signal and Hazard Warning Switch** in the Removal and Installation section of this group for the procedures.

(14) Remove the wiper and washer switch from the multi-function switch mounting housing. Refer to **Wiper and Washer Switch** in the Removal and Installation section of Group 8K - Wiper and Washer Systems for the procedures.

INSTALLATION

If the clockspring is not properly centered in relation to the steering wheel, steering shaft and steering gear, it may be damaged. Refer to **Clockspring Centering** in the Adjustments section of Group 8M - Passive Restraint Systems before installing or reinstalling a clockspring.

NOTE: Before starting this procedure, be certain that the front wheels are still in the straight-ahead position.

(1) Install the wiper and washer switch onto the multi-function switch mounting housing. Refer to **Wiper and Washer Switch** in the Removal and Installation section of Group 8K - Wiper and Washer Systems for the procedures.

(2) Install the turn signal and hazard warning switch onto the multi-function switch mounting housing. Refer to **Turn Signal and Hazard Warning Switch** in the Removal and Installation section of this group for the procedures.

(3) Rotate the turn signal cancelling cam in the multi-function switch mounting housing until the alignment hole in the one cam lobe is aligned with the alignment hole in the back of the housing. The oblong hole in the hub of the cam should now be at the top, and the locating tab in the hub of the cam should be at the bottom (Fig. 13).

(4) While holding the centered clockspring hub and case stationary in relationship to each other, align and seat the three pins in the clockspring hub with the three holes in the hub of the turn signal cancelling cam. It should be noted that when the clockspring is properly centered the uppermost pin in the clockspring hub is an oblong pin, and it will only fit in the oblong hole in the hub of the turn signal cancelling cam.

(5) Align and seat the one pin and the two mounting holes on the clockspring case to their respective holes in the multi-function switch mounting housing.

(6) Install and tighten the two clockspring mounting screws. Tighten the screws to 2.5 N·m (22 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

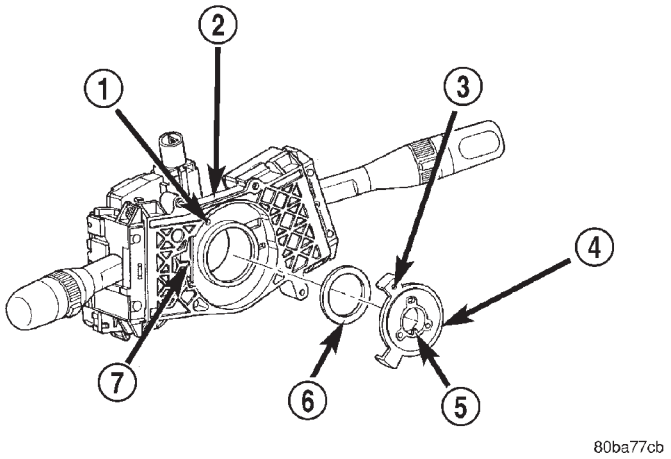


Fig. 13 Turn Signal Cancelling Cam Alignment

1 – ALIGNMENT HOLE
2 – MULTI-FUNCTION SWITCH MOUNTING HOUSING
3 – ALIGNMENT HOLE
4 – TURN SIGNAL CANCELLING CAM
5 – LOCATING TAB
6 – WASHER
7 – TURN SIGNAL SWITCH CANCEL ACTUATOR

(7) Position the multi-function switch mounting housing, the clockspring and both multi-function switches onto the top of the steering column as a unit. The locating tab in the hub of the turn signal cancelling cam must be engaged with the alignment groove in the bottom of the upper steering column shaft.

(8) From the underside of the steering column, install and tighten the one screw that secures the multi-function switch mounting housing to the top of the column housing. Tighten the screw to 1.9 N·m (17 in. lbs.).

(9) Reconnect the instrument panel wire harness connectors to the lower clockspring connector receptacles, the right multi-function switch connector receptacle and the left multi-function switch connector receptacle.

(10) Position the lower tilting steering column shroud to the steering column.

(11) Install and tighten the screw that secures the shroud to the multi-function switch mounting housing. Tighten the screw to 1.9 N·m (17 in. lbs.).

(12) Position the upper tilting column shroud to the steering column with the hazard warning switch button inserted through the hole in the upper surface of the shroud. Align the upper tilting steering column shroud to the lower shroud and snap the two shroud halves together.

(13) Install the steering wheel to the steering column upper shaft. Be certain to index the alignment splines in the hub of the steering wheel armature with the splines on the shaft. Pull the clockspring wire harness through the hole between the two upper steering wheel armature spokes.

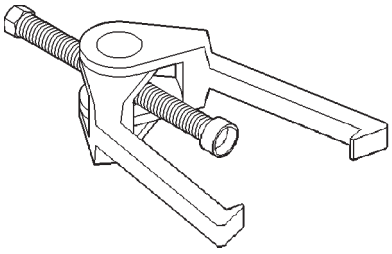
(14) Install and tighten the steering wheel mounting nut. Tighten the nut to 47 N·m (420 in. lbs.). Be certain not to pinch the wire harnesses between the steering wheel and the nut.

(15) Reconnect the steering wheel wire harness connector to the upper clockspring connector receptacle, which is located between the two upper spokes of the armature within the hub cavity of the steering wheel.

(16) Install the driver side airbag module onto the steering wheel. Refer to **Driver Side Airbag Module** in the Removal and Installation section of Group 8M - Passive Restraint Systems for the procedures.

SPECIAL TOOLS

TURN SIGNAL AND HAZARD WARNING SYSTEMS



Puller C-3894-A