STEERING COLUMN ASSEMBLIES

WARNING: IF EQUIPPED WITH AIR CUSHION RESTRAINT SYSTEM, DO NOT ATTEMPT ANY ADJUSTMENT, REPAIR OR REMOVAL OF THE STEERING COLUMN AND/OR STEERING WHEEL UNTIL THE DISCONNECTION PROCEDURE IS COMPLETED. THIS PROCEDURE MUST BE FOLLOWED TO PREVENT ACCIDENTAL DEPLOYMENT OF THE SYSTEM WHICH COULD RESULT IN PERSONAL INJURY AND/OR DAMAGE TO THE SYSTEM'S COMPONENTS.

A.C.R.S. DISCONNECTION PROCEDURE

1. Turn ignitbon switch to "LOCK" position. Disconnect the negative battery cable from the battery and tape end.

CONTENTS

DESCRIPTION AND OPERATION

DESCRIPTION AND OPERATION OF KEY RELEASE COLUMN - H SERIES

The H Series uses a key release energy absorbing column. This column varies from the function locking column in that no shifting is performed on the column. This eliminates the shift-tube and back drive systems.

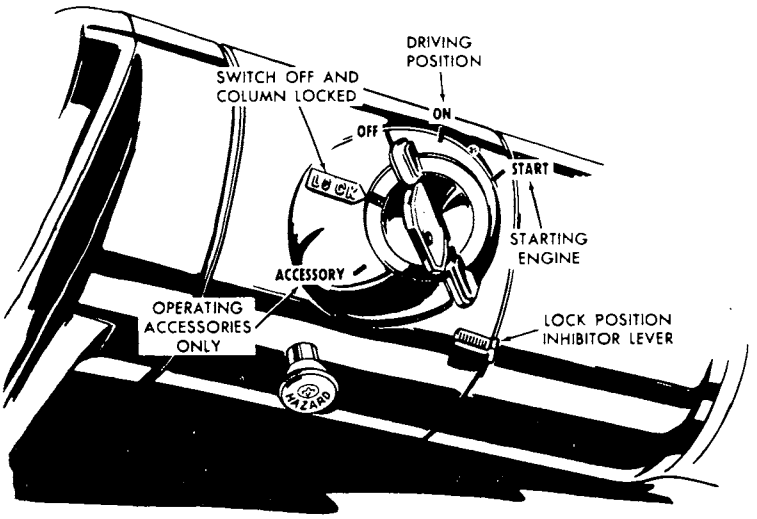
The operation of the lock is basically the same as the function locking column except it cannot be positioned in "OFF LOCK" or "ACCESSORY" or remove the key except by depressing the key release lever. Figure 3G-1.

DESCRIPTION AND OPERATION OF FUNCTION LOCKING COLUMN - X-A-B-C-E SERIES

The X-A-B-C-E Series use the function locking energy absorbing column. When the shift lever is in "PARK" for automatic transmission, or "REVERSE" for standard transmissions and lock the ignition. The steering wheel locks and the gearshift locks automatically.

DESCRIPTION OF ENERGY ABSORBING COLUMN

The Energy Absorbing Steering Column assembly is used on all series cars. This column is designed to compress



Key Removal Note:

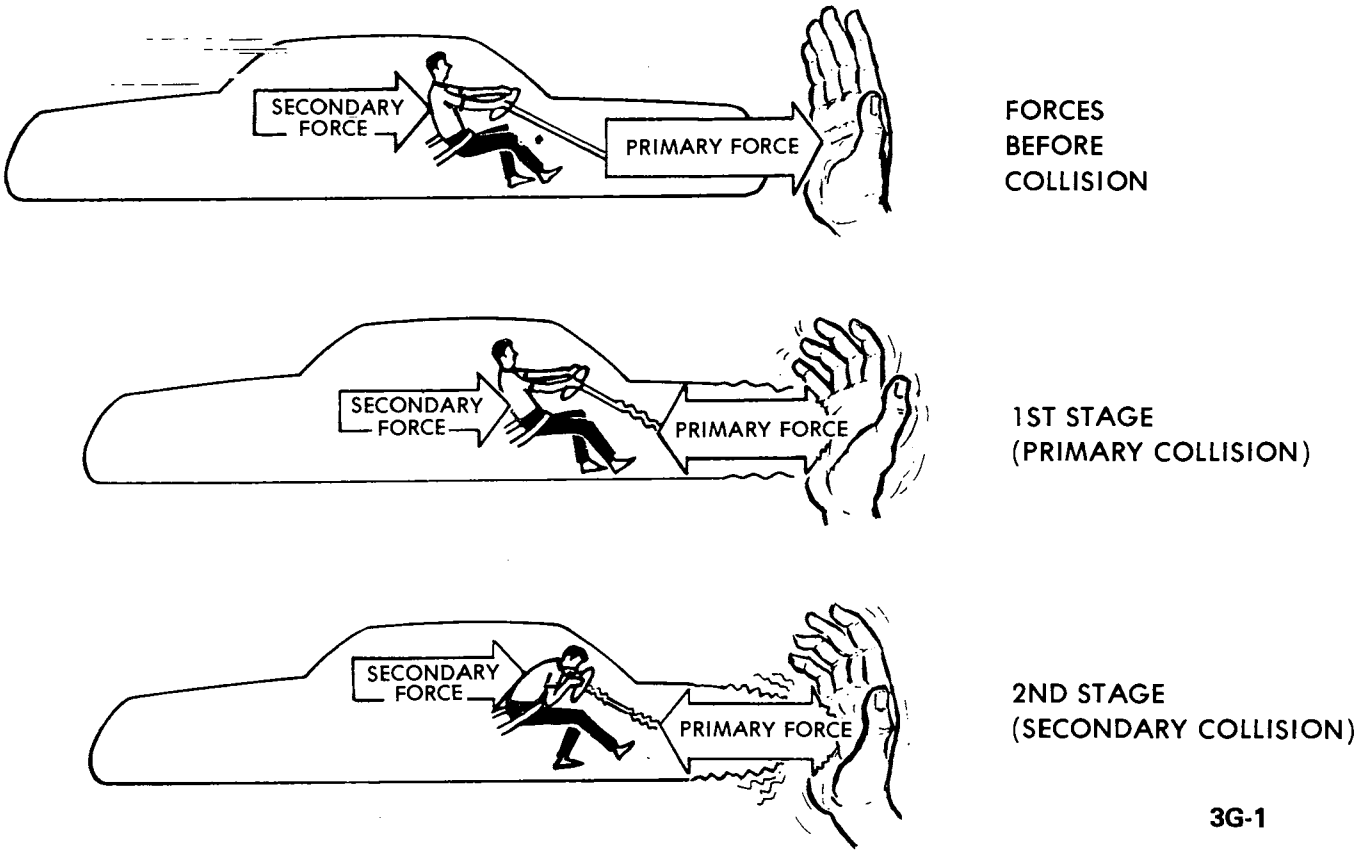
To remove key from ignition; depress lock inhibitor lever, turn ignition to LOCK position, then remove key.

5B3G1

Figure 3G-1 - Lock Inhibitor Lever - Key Release Column

under impact. When an automobile is being driven, the forward movement of the automobile and the forward movement of the driver both constitute a form of energy or force. When an automobile is involved in a frontal collision, the primary force (forward movement of the car) is suddenly halted, while the secondary force (the driver) continues its forward direction. A severe collision generally involves these two forces - the primary and the secondary forces. The secondary impact occurs when the driver is thrust forward onto the steering wheel and column. See Figure 3G-2.

During a collision, the steering column compresses and thereby reduces its tendency to move rearward into the driver's compartment. A split second later when the driver is thrown forward (the secondary impact) his en-



3G-1

Figure 3G-2 Reaction of Forces in a Collision

ergy is also partially absorbed by the compression characteristics of the column.

The Energy Absorbing Column assembly may be easily disassembled and reassembled. It is important that only the specified screws, bolts and nuts be used as designated during reassembly, and that they are tightened to their specified torque. This precaution will insure the energy absorbing action of the assembly. Particular care should be exercised to avoid using overlength bolts as they may prevent a portion of the assembly from compressing under impact. Equally as important is correct torquing of all bolts and nuts. In particular, care should be taken to assure that the bolts or nuts securing the column mounting bracket to the instrument panel are torqued to the proper specification in order that the bracket will break away under impact.

When the Energy Absorbing Column is installed in a car it is no more susceptible to damage through usage than an ordinary column; however, when the column is removed, special care must be taken in handling this assembly. *Only the specified wheel puller should be used.* When the column is removed from the car, such actions as a sharp blow on the end of the steering shaft or shift levers, laying things across or on top of the column assembly, leaning on the column assembly, or dropping of the assembly could shear or loosen the plastic fasteners that maintain column rigidity or possibly bend the assembly causing a binding condition. *It is therefore important that the removal and installation and the disassembly and reassembly procedures be strictly followed when servicing this assembly.*

X-A-B-C-E Series Buicks incorporate a pot joint in the lower portion of the steering shaft. The pot joint acts as a universal joint to compensate for misalignment of the steering column. To insure proper operation of the pot joint, the capsule bracket and toe pan covers provide exact alignment of the column in the body. It is mandatory that the installation of this column be followed exactly as outlined.

DESCRIPTION OF TILT AND TILT TELESCOPING COLUMNS

The tilt and tilt telescoping columns are designed for ease of entry and driver comfort. The tilt column has several different steering wheel angle positions. The tilt and telescope not only tilts, but also has an infinite number of distance adjustments between the driver and the wheel with in a 2 in. range.

The telescoping feature is operated by a locking lever. The wheel is fastened to the upper shaft which telescopes inside the upper yoke. As the locking lever is released, pressure is released on the locking rod and wedge. This allows the shaft to move. Figure 3G-3. To adjust the steering wheel, rotate the locking lever counter-clockwise, adjust the wheel by pushing or pulling and lock into position by rotating the lever clockwise

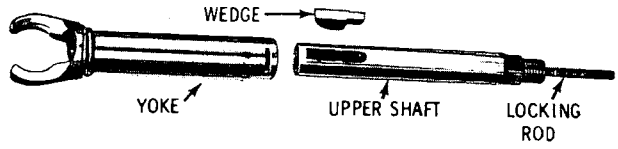


Figure 3G-3 Upper Steering Shaft T & T Column

DIAGNOSIS

DIAGNOSIS OF STEERING COLUMN

Condition	Cause	Correction
Poor return of steering center.	Misaligned steering shaft.	Align steering shaft.
Excessive play or looseness in steering system.	Torn steering shaft flex coupling or worn pot joint.	Replace flex coupling or pot joint.
Hard steering effort.	Column assembly misaligned.	Realign assembly.
	Improperly installed or deformed dust seal.	Install new seal.
	Malfunctioning upper or lower bearing.	Replace bearing.
	Flash on inner diameter of shift tube from plastic joint.	Replace shift tube.

Condition	Cause	Correction
	Tight steering universal joint.	Repair or replace joint.
Key sticks in start.	Actuator rod deformed.	Straighten or replace rod.
	Any high effort condition.	Check items under "Hard Steering Effort".
Key cannot be removed "off-lock".	Ignition switch is not set correctly.	Readjust switch.
	Malfunctioning lock cylinder.	Replace cylinder.
Lock cylinder can be removed without depressing retainer.	Malfunctioning retainer.	Replace cylinder.
	Cylinder without retainer.	Replace cylinder.
	Burr over retainer slot in housing.	Remove burr in housing.
Will not unlock.	Shear flange on sector shaft collapsed.	Replace sector.
	Lock bolt damaged.	Replace lock bolt.
	Malfunctioning lock cylinder.	Replace lock cylinder.
	Damaged housing.	Replace housing.
	Damaged sector.	Replace sector.
	Damaged rack.	Replace rack.
Will not lock.	Lock bolt spring broken or malfunctioning.	Replace lock bolt spring.
	Damaged sector tooth.	Replace sector.
	Malfunctioning lock cylinder.	Replace lock cylinder.
	Burr on lock bolt or housing.	Remove burr.
	Damaged housing.	Replace housing.
	Transmission linkage adjustment incorrect. (Function Locking Column)	Readjust.
	Damaged rack.	Replace rack.

Condition	Cause	Correction
	Interference between bowl and rack coupling.	Replace bowl or actuator rod as required.
	Ignition switch stuck.	Replace ignition switch.
	Actuator rod restricted.	Readjust.
	Sector Installed incorrectly.	Install Correctly.
High effort on lock cylinder between "off" and "off-lock"	Distorted Rack.	Replace Rack.
High effort required turn key.	Lock cylinder malfunctioning.	Replace lock cylinder.
	Ignition switch malfunctioning.	Replace ignition switch.
	Rack preload spring broken or deformed.	Replace preload switch.
	Burrs on sector, rack, housing, support or actuator rod coupling.	Remove burr.
	Bent sector shaft.	Replace shaft.
	Malfunctioning rack.	Replace rack.
	Extreme misalignment of housing to cover.	Replace either or both.
	Distorted coupling slot in rack.	Replace rack.
	Bent actuator rod.	Straighten or replace.
	Ignition switch mounting bracket bent.	Straighten or replace.
	Actuator Rod Restricted.	Remove Restriction.
Noise in column.	Coupling bolts not tightened.	Tighten pinch bolts to 30 ft.lbs.
	Column not correctly aligned.	Realign column.
	Coupling pulled apart.	Realign column and replace coupling.
	Broken lower joint.	Repair joint, and realign column.

Condition	Cause	Correction
	Horn contact ring not lubricated.	Lubricate with lubriplate.
	Lack of grease on bearings or bearing surfaces.	Lubricate.
	Loose sight shields.	Bend to eliminate rattle.
	Lower shaft bearing worn or tight.	Replace bearing. Check shaft and replace if scored.
	Upper shaft bearing worn or tight.	Replace bearing assembly or housing assembly.
	Shaft lock plate cover loose.	Tighten three screws to 15 in.lbs., or if missing, replace. CAUTION: Use specified screws.
	Shaft lock snap ring not seated.	Replace snap ring. Check for proper seating in groove.
	One click when in "off-lock" position and the steering wheel is moved.	Normal - lock is seating.
	Lock plate retaining ring not seated.	Replace retaining ring. Check for proper seating in groove.
Housing scraping on bowl.	Bowl bent or not concentric with hub.	Replace bowl.
Steering wheel loose.	Excessive clearance between holes in support or housing and pivot pin diameters.	Replace either or both.
	Malfunctioning or missing antilash spring in spheres.	Add spring or replace both.
	Upper bearing not seating in bearing.	Replace both.
	Upper bearing inner race seat missing.	Install seat.
	Improperly adjusted T & T locking knobs.	Readjust.
	Loose support screws.	Tighten 60 in.lbs.
	Bearing preload spring missing or broken.	Replace preload spring.
Steering wheel loose - every other tilt position.	Loose fit between shoe and shoe pivot pin.	Replace both.

Condition	Cause	Correction
Steering column not locking in any tilt position.	Shoe seized on its pivot pin.	Replace both.
	Shoe grooves may have burrs or dirt.	Replace shoe.
	Shoe lock spring weak or broken.	Replace lock spring.
Steering wheel fails to return to top tilt position.	Pivot pins are bound up.	Replace pivot pins.
	Wheel tilt spring is malfunctioning.	Replace tilt spring.
	Turn signal switch wires too tight.	Readjust.
Noise when tilting column.	Upper tilt bumpers worn.	Replace tilt bumper.
	Tilt spring rubbing in housing.	Lubricate.
High shift effort. (Function locking column)	Column not alighed correctly in car.	Realign.
	Wave washer with burrs.	Replace.
	Improperly installed dust seal.	Remove and replace.
	Lack of grease on seal or bearing.	Lubricate
	Improper screws used for ignition switch, neutral start switch or mounting bracket.	Use correct fasteners.
	Burr on upper or lower end of shift tube.	Remove burr.
	Lower bowl bearing Reas not aligned correctly.	embly correctly.
Improper transmission shifting. (Function locking column)	Sheared shift tube joint.	Replace shift tube assembly.
	Improper transmission linkage adjustment.	Readjust.
	Loose lower shift lever.	Replace shift tube assembly.
	Improper gate plate.	Replace with correct part.

Condition	Cause	Correction
Lash in mounted column assembly	IP to column bracket mounting bolts loose.	Tighten to 20 ft.lbs.
	Broken weld nuts on jacket.	Replace jacket assembly.
	IP bracket capsule sheared.	Replace bracket assembly.
	Loose shoes in housing.	Replace shoes.
	Loose tilt head pivot pins.	Replace pivot pins.
	Loose shoe lock pin in support.	Replace pin.
	Loose support screws.	Tighten to 60 in.lbs.
	Column bracket to jacket bolts loose.	Tighten 15 ft.lbs.
Driver can lock steering in second gear. (Manual Transmission Function Locking Column)	Malfunctioning upper shift.	Replace lever.
	Malfunctioning shift lever gate.	Replace shift lever gate.
	Loose relay lever on shift tube.	Replace shift tube assembly.
	Use of upper shift lever prior to 1969 model year.	Replace with current shift lever.

MAINTENANCE AND ADJUSTMENTS

CHECKING STEERING COLUMN FOR DAMAGE

Cars involved in accidents resulting in frame damage, major body or sheet metal damage, or where the steering column has been impacted may also have a damaged or misaligned steering column.

1. Check capsules on steering column bracket assembly: They should be within 1/16" of bottom of the slots. If capsule has moved more than 1/16", some column collapse may have occured, and the bracket must be replaced. In this case the steering column must be checked as outlined below.

2. On cars with automatic transmission and column shift, check operation of the shift lever. If you are able to move lever to "Park" position without raising lever, it is an indication that the upper shift tube plastic bearing is broken.

3. On X-A-B-C-E Series check for mast jacket collapse by measuring the distance from the edge of the neutral-start switch window opening and the bottom of the upper jacket. The correct dimensions are shown in Figure 3G-4.

4. Check for broken plastic bearing adapter at lower end of steering shaft. (All except column shift manual transmission.) If adapter is cracked or broken, it must be replaced and the column aligned.

5. Check steering gear flexible coupling for stretching, compression, tears, excessive angularity or for no pin engagement. This indicates possible misalignment or frame damage. If flexible coupling damage is evident, the coupling is to be replaced and the steering column is to be realigned.

6. On X-A-B-C-E Series check for lower shaft end-play clearance in pot joint by grasping shaft and pushing into pot joint. Some end-play must be present. If no end-play is present, disconnect lower shaft assembly at flexible coupling and measure the distance, as shown in Figure 3G-4.

If the above checks indicate the column has been damaged, the column must be disassembled for further inspection of internal components, such as shift tube, upper steering shaft injection molding, and turn signal switch.

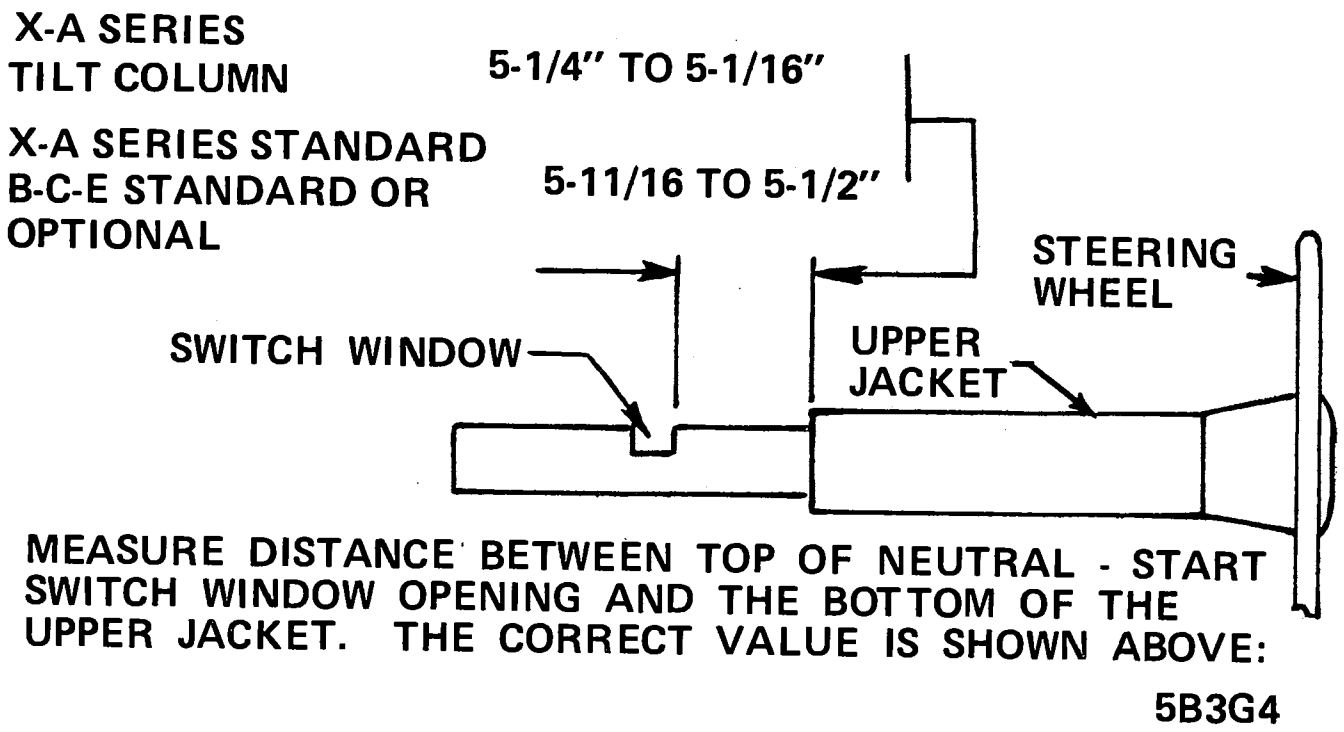


Figure 3G-4 - X-A-B-C-E Series - Checking for Column Damage

After all repairs have been made or inspection completed, the column must be reinstalled according to the service procedures.

MAJOR REPAIR

REMOVAL AND INSTALLATION OF HORN LEAD AND DRIVERS CUSHION MODULE AIR CUSHION RESTRAINT

Removal

1. Disconnect A.C.R.S. by turning ignition switch to "Lock" position. Disconnect the negative battery cable from the battery and tape the end of the cable to insulate it.

2. Using Tool J-24628-2 remove the (4) module to steering wheel screws. Figure 3G-6. Lift up module and disconnect horn wire. Then, using Tool J-24628-3, disconnect modual wire connector from shop ring.

The horn actvator is not servicable.

WARNING: DRIVER AIR CUSHION MODULE SHOULD ALWAYS BE CARRIED WITH VINYL COVER AWAY FROM ALL PARTS OF ONES BODY AND SHOULD ALWAYS BE LAID ON A FLAT SURFACE WITH VINYL SIDE UP. THIS IS NECESSARY SO THAT A FREE SPACE IS PROVIDED TO ALLOW THE AIR CUSHION TO EXPAND IN CASE OF ACCIDENTIAL DEPLOYMENT.

Installation

1. Hold cushion module with emblem in the lower right hand corner.

2. Loop the air cushion harness clockwise from the 11:00 o'clock position to the 6:00 o'clock position. Install the module connector by pushing onto the column circuit firmly and check for fully seating.

3. Install horn wire.

4. Position module making sure wiring is still in place and install all (4) screws using Tool J-246282 24628-2 torque to specifications.

5. Reconnect battery negative wire.

6. Rotate ignition switch to any position but lock and check that the restraint indicator light operates correctly.

REMOVAL AND INSTALLATION OF STEERING WHEEL - AIR CUSHION RESTRAINT

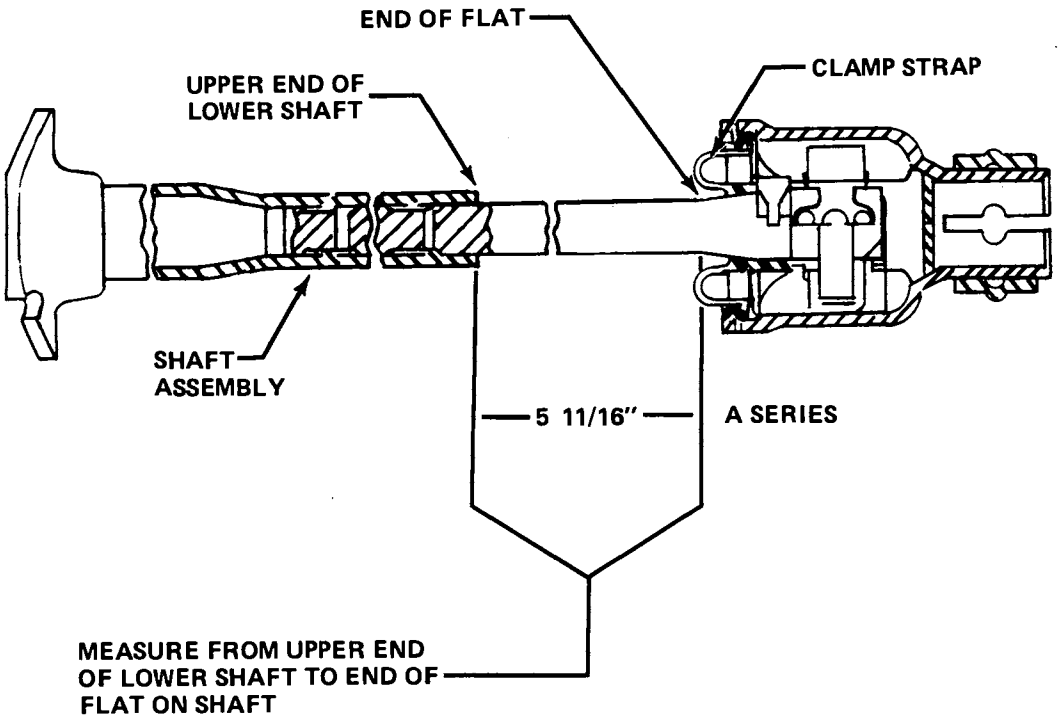
Removal

1. Remove drivers air cushion module as outlined.

2. Loosen steering wheel retaining nut several turns but do not remove. Figure 3G-7.

3. Attach puller J-3274 to wheel and pull wheel up to nut. Do not tap or strike puller or underside of wheel as this may loosen the plastic injections. If necessary use penetrating lubricant to help loosen wheel.

X-A STEERING COLUMN



B-C-E STEERING COLUMN

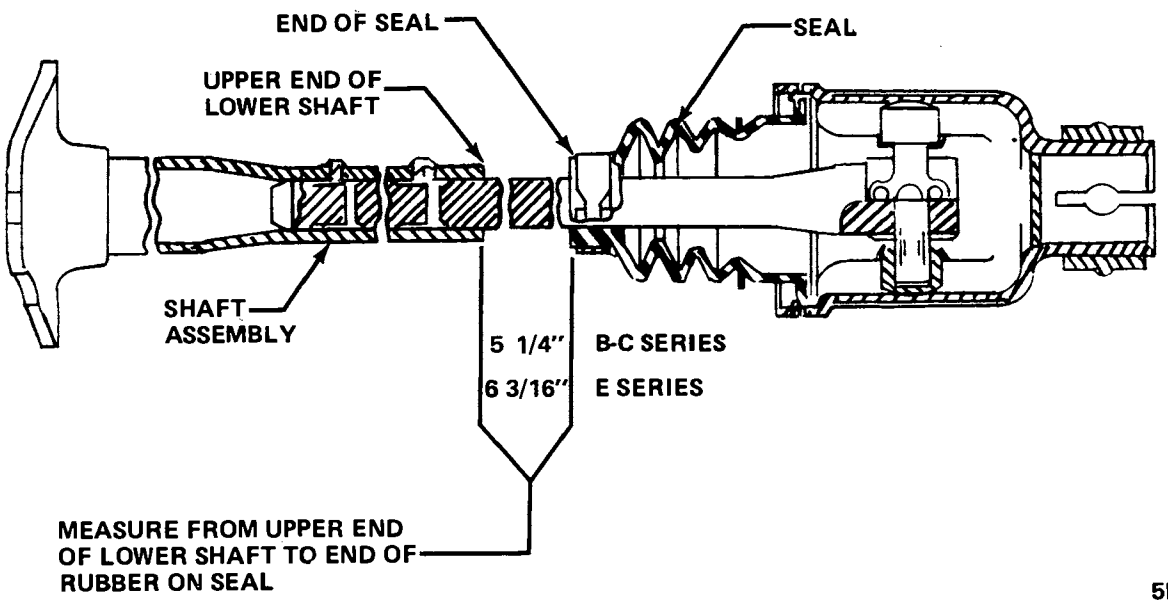


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Figure 3G-5

Installation

1. Reverse the removal procedure for installation. Make sure to align the mark on the steering shaft with mark on wheel hub. Torque nut to specifications.

> **CAUTION:** *This steering wheel to steering shaft fastener is an important attaching part in that could affect the performance of vital components and systems, and/or could result in major repair expense. It must be replaced with one of the same part number, or with an equivalent part, if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.*

REMOVAL AND INSTALLATION OF HORN ACTUATOR BAR AND STEERING WHEEL–STANDARD AND TILT COLUMN

Removal

1. Disconnect battery negative cable.

2. On rallye steering wheel, pull off cap, remove three screws and take off contact, insulator eyelet and spring Figure 3G-8.

On other wheels, remove the screws from underside of wheel and partially lift off bar, pull lead connector from canceling cam, then lift of actvator bar. Figures 3G-9, 3G-10 and 3G-11.

3. Remove the retaining nut snap ring if equipped. Figure 3G-13.

4. Loosen the steering wheel retaining nut several turns, but do not remove.

5. With puller J-3274 pull wheel up to nut. Do not tap or strike puller or underside of steering wheel to jar loose as this may loosen the plastic injections in the column. The only recommendation for freeing a frozen wheel is to use penetrating lubricant.

Installation

1. Reverse the removal from installations.

2. Align location mark of steering shaft with wheel and torque nut to specifications.

> **CAUTION:** *This steering wheel to steering shaft fastener is an important attaching part in that it could affect the performance of vital components and systems, and/or could result in major repair expense. It must be replaced with one of the same part number, or with an equivalent part, if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.*

REMOVAL AND INSTALLATION OF HORN ACTUATOR BAR AND STEERING WHEEL–TELESCOPING COLUMN

Removal

1. Disconnect the negative battery cable.

2. Remove the screws from underside of wheel and partially lift off bar, pull lead connector from canceling cam, then lift of actvator bar. Figure 3G-12.

3. Remove the three bolts securing the flange and lever to the wheel hub and remove flange and lever.

4. Remove the retaining nut snap ring. Figure 3G-13.

5. Loosen the steering wheel retaining nut several turns, but do not remove.

6. With puller J-3274 pull wheel up to nut. Do not tap or strike puller or underside of wheel as this may loosen the plastic injection in the column. The only recommended method of removing a frozen wheel is with the aid of penerating lubricant.

> **CAUTION:** *This steering wheel to steering shaft fastener is an important attaching part in that it could affect the performance of vital components and systems, and/or could result in major repair expense. It must be replaced with one of the same part number, or with an equivalent part, if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.*

Installation

1. Reverse the removal procedure for installation.

2. Align location mark on steering shaft with wheel and torque nut to specifications.

REMOVAL AND INSTALLATION OF STEERING COLUMN

Once the steering column is removed from the car, the column is extremely susceptible to damage. Dropping the column assembly on its end could collapse the steering shaft or loosen the plastic injections which maintain column rigidity. Leaning on the mast jacket could cause jacket to bend or deform. Any of the above damage could impair the column's collapsible design. If it is necessary to remove the steering wheel, use the specified wheel puller. Do not hammer on end of shaft, as hammering could loosen plastic injections which maintain column rigidity.

H Series Removal

1. Disconnect battery ground cable.

2. Remove steering wheel as outlined.

3. Remove steering coupling shield. Remove pinch bolt at coupling (rag joint) separate coupling from steering

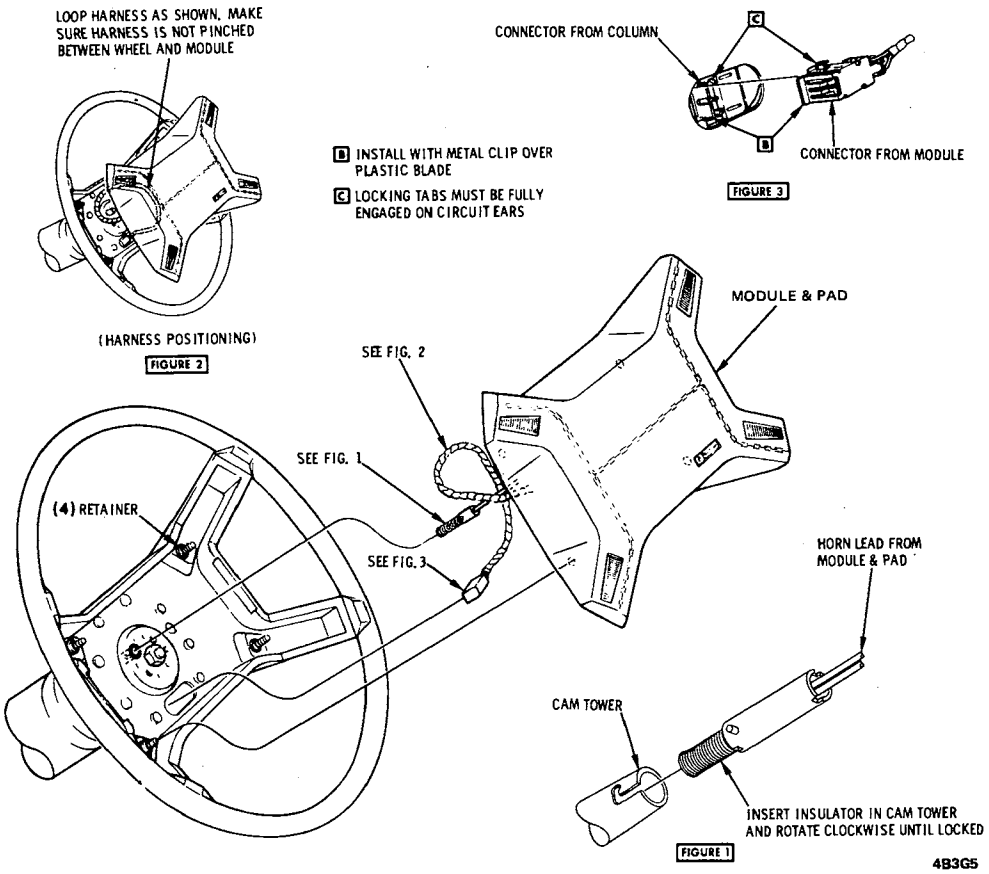


Figure 3G-6 Air Cushion Restraint Drivers Module

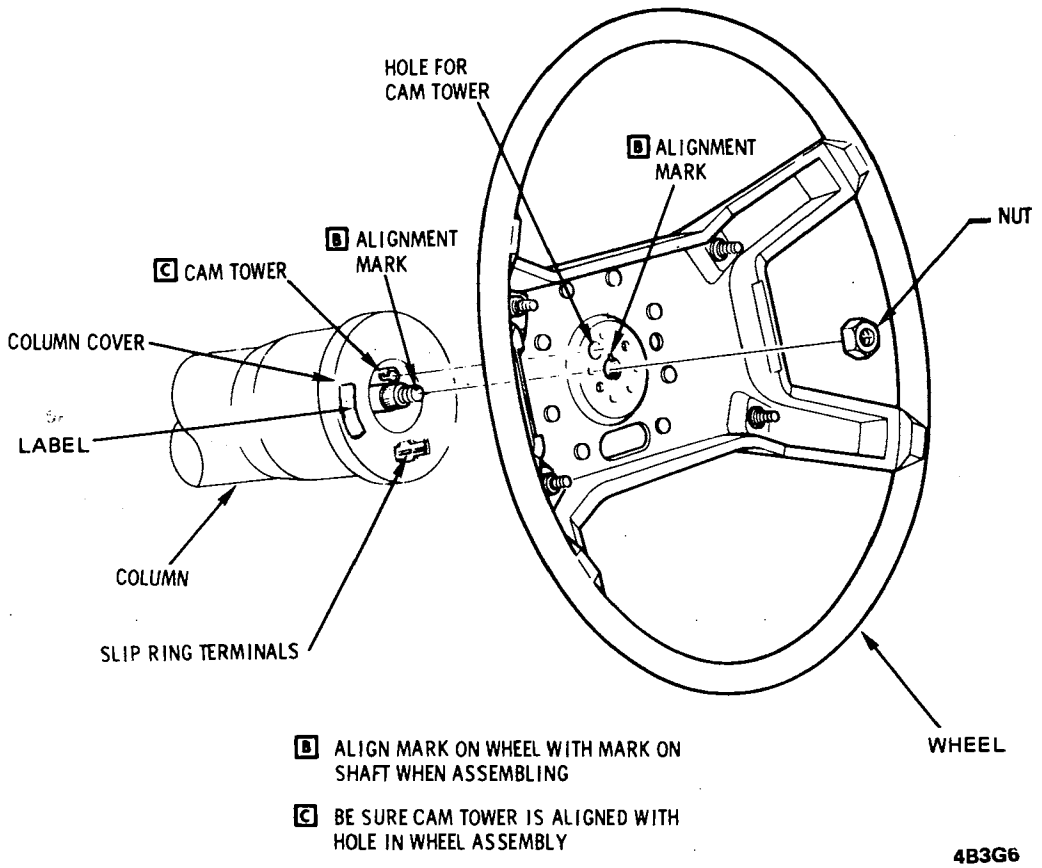
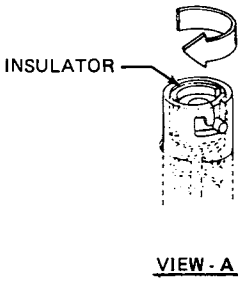


Figure 3G-7 Air Cushion Restraint Steering Wheel

[A] ALIGNMENT MARKS ON WHEEL AND SHAFT MUST BE IN LINE.

[B] CAUTION: DO NOT STAKE NUT TO SHAFT.
WHEN WHEEL REMOVAL IS REQUIRED, PULLER MUST BE USED. DO NOT HAMMER ON END OF STEERING SHAFT.



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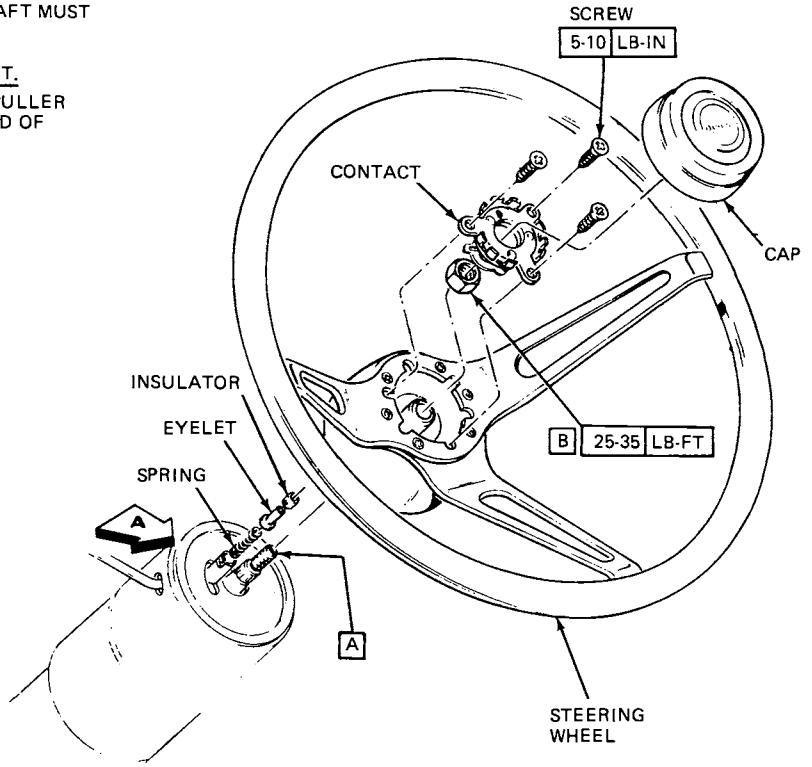

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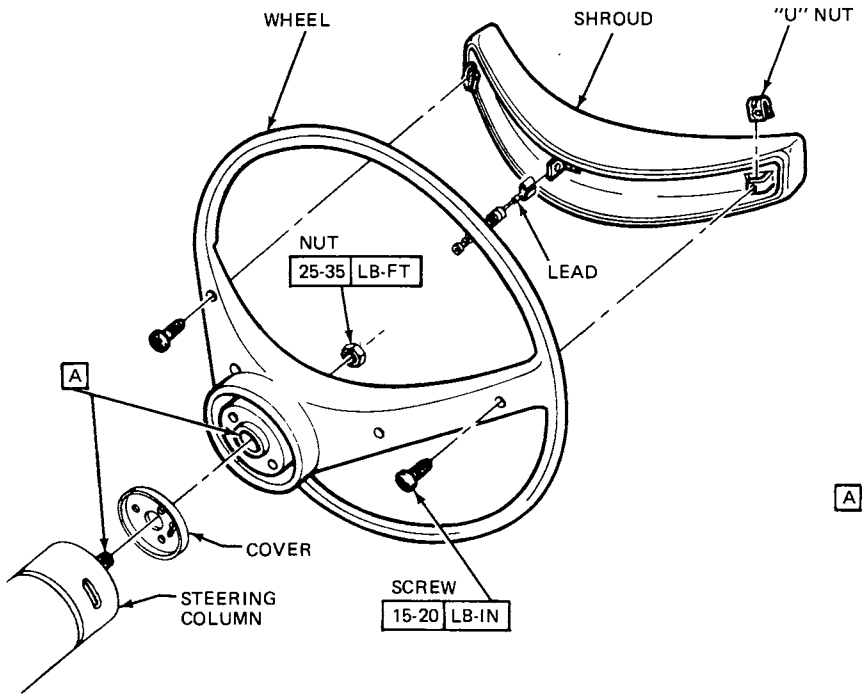
Figure 3G-8 Ralley Steering Wheel - H-X-A Series



[A] NOTCH IN HUB OF WHEEL ASSEMBLY MUST BE IN LINE WITH MARK ON SHAFT.

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Figure 3G-9 X Series Steering Wheel

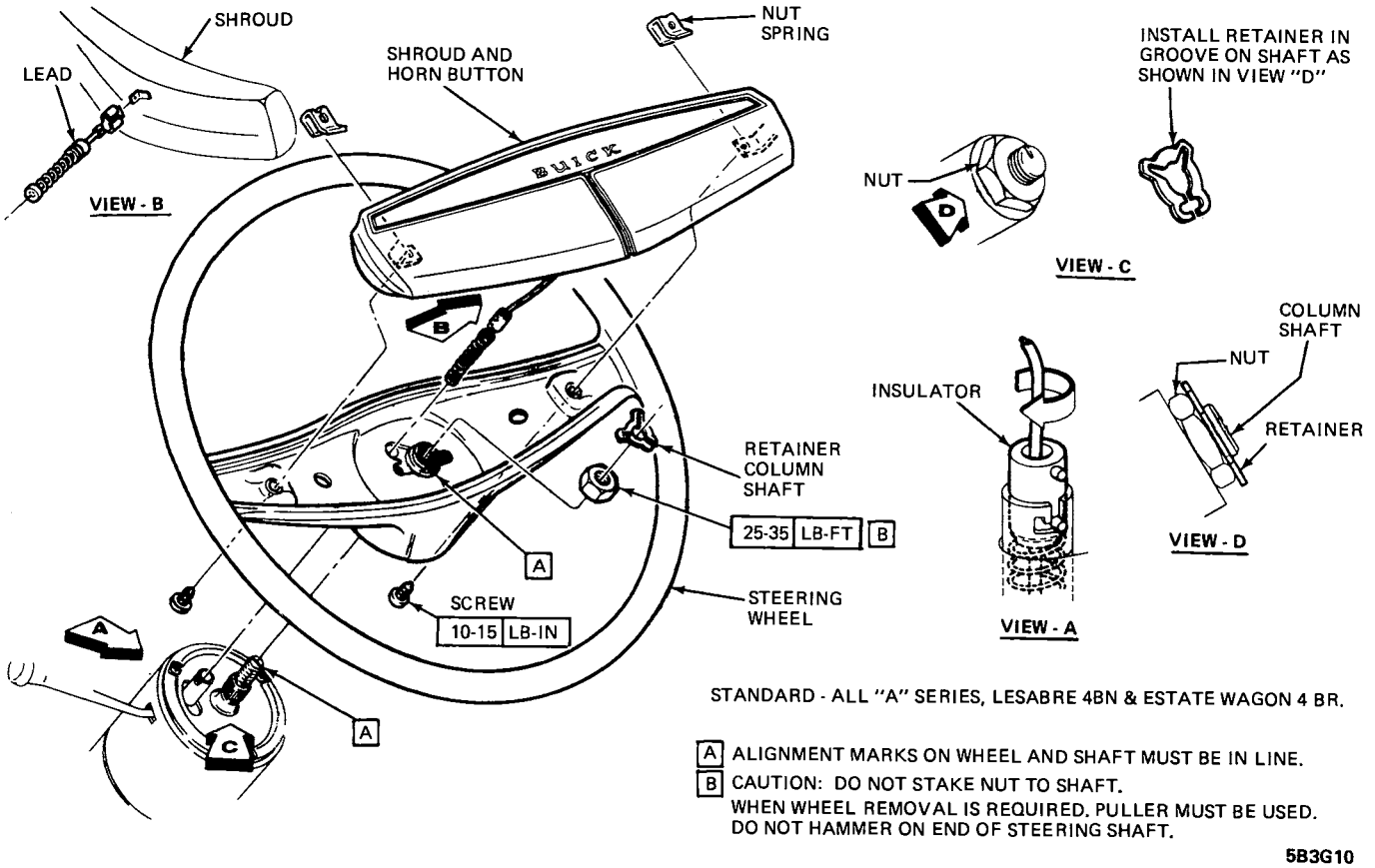


Figure 3G-10 A-B Series Standard Steering Wheel

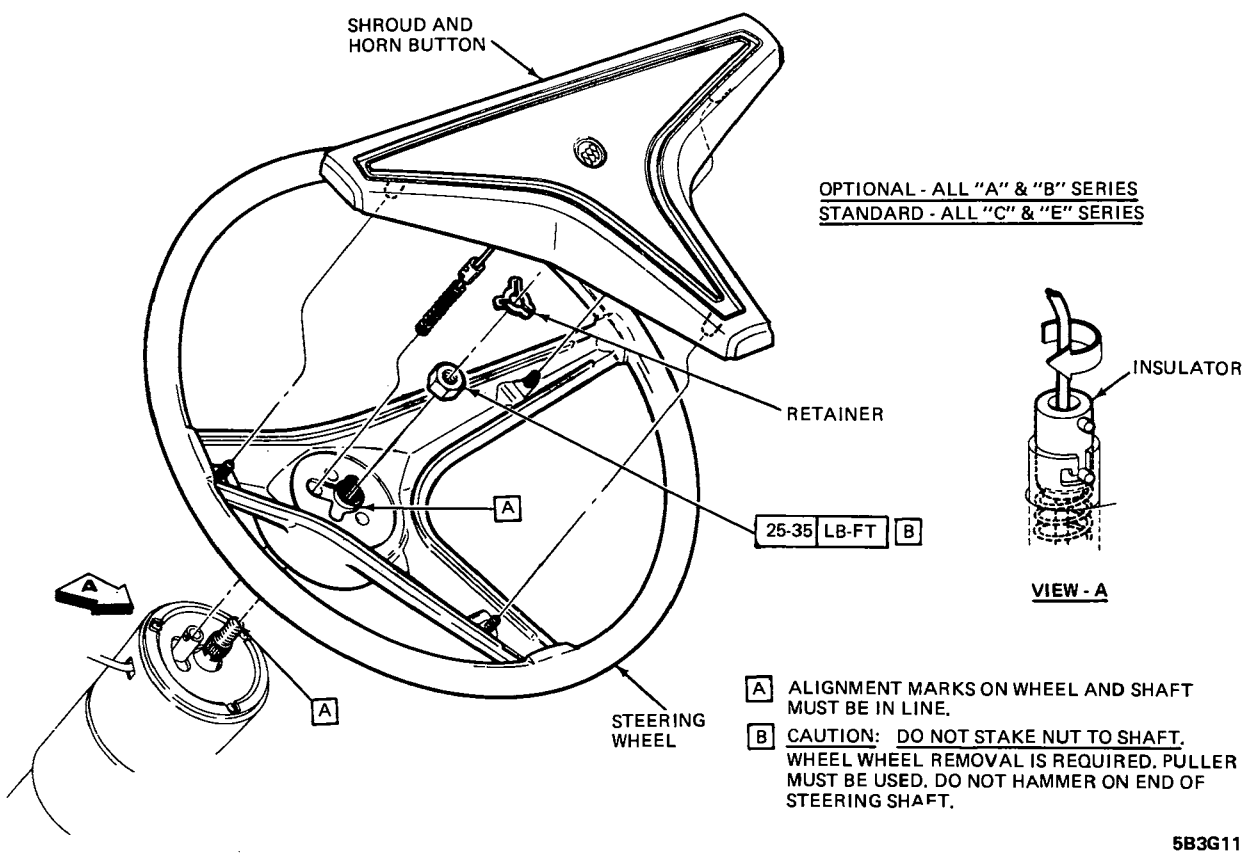


Figure 3G-11 - A-B-C-E Series Steering Wheel

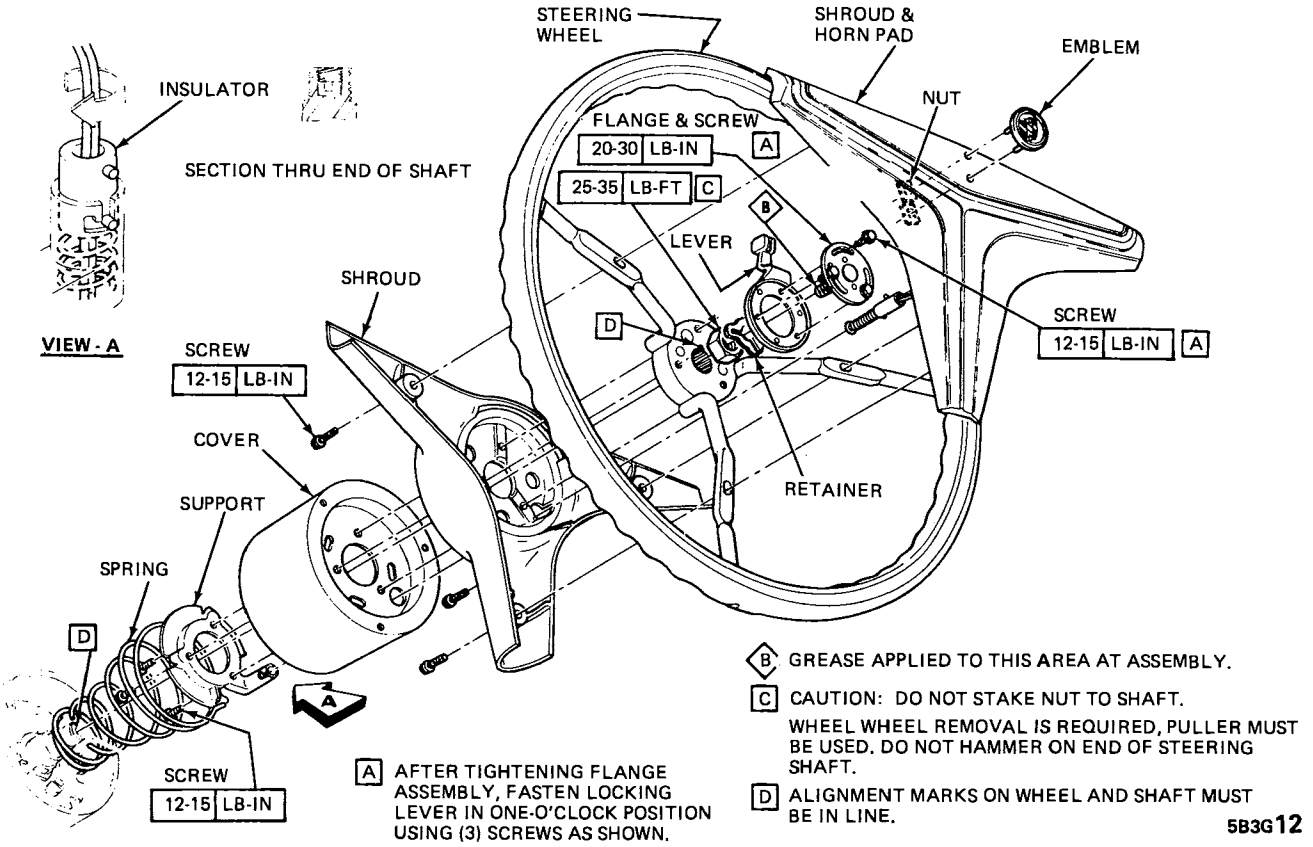


Figure 3G-12 Telescoping Steering Wheel

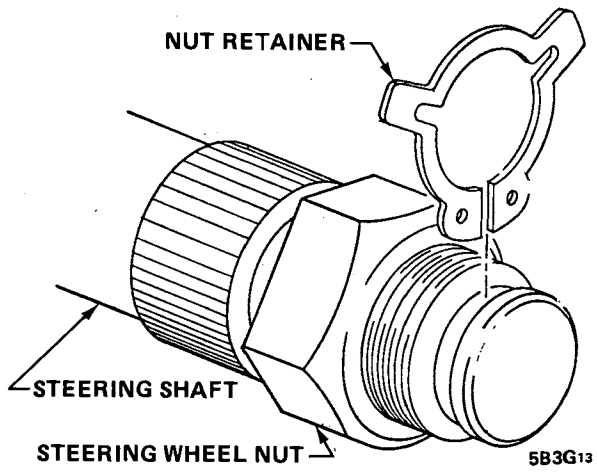


Figure 3G-13 Steering Wheel Nut Retaining Ring

shaft. If vehicle is equipped with standard column and manual steering, remove pinch bolt at gear worm shaft.

4. Remove the three screws securing the toe plate to the firewall. Figure 3G-14.

5. Remove the nuts securing the mounting bracket to the instrument panel. Figure 3G-14.

6. Disconnect all electrical connectors. Figure 3G-15.

7. Carefully withdraw column from vehicle.

H Series Installation

1. Carefully place column into vehicle. Assemble coupling to steering shaft. Tighten pinch bolt to 30 ft. lbs.

2. Connect all electrical connections between the column and body. Figure 3G-15.

3. Position bracket on instrument panel and drive both nuts. Tighten to 20 ft. lbs. Figure 3G-16.

4. Drive the three toe plate screws and tighten to 45 in. lb.

5. Install steering wheel.

6. Connect battery negative cable.

7. Install coupling shield. Figure 3F-47.

X Series Removal

Front of dash mounting plates must be loosened whenever the steering column is to be lowered from the instrument panel.

1. Disconnect the battery ground cable.

2. Remove the steering wheel as outlined.

3. Remove the steering coupling shield.

4. Remove the nuts and washers securing the flang end of the steering shaft to the flexible coupling.

5. Disconnect the transmission control linkage from column shift tube levers.

6. Disconnect the steering column harness at wire connector. Disconnect the neutral-start switch backup lamp switch connectors if so equipped. Figure 3G-17.

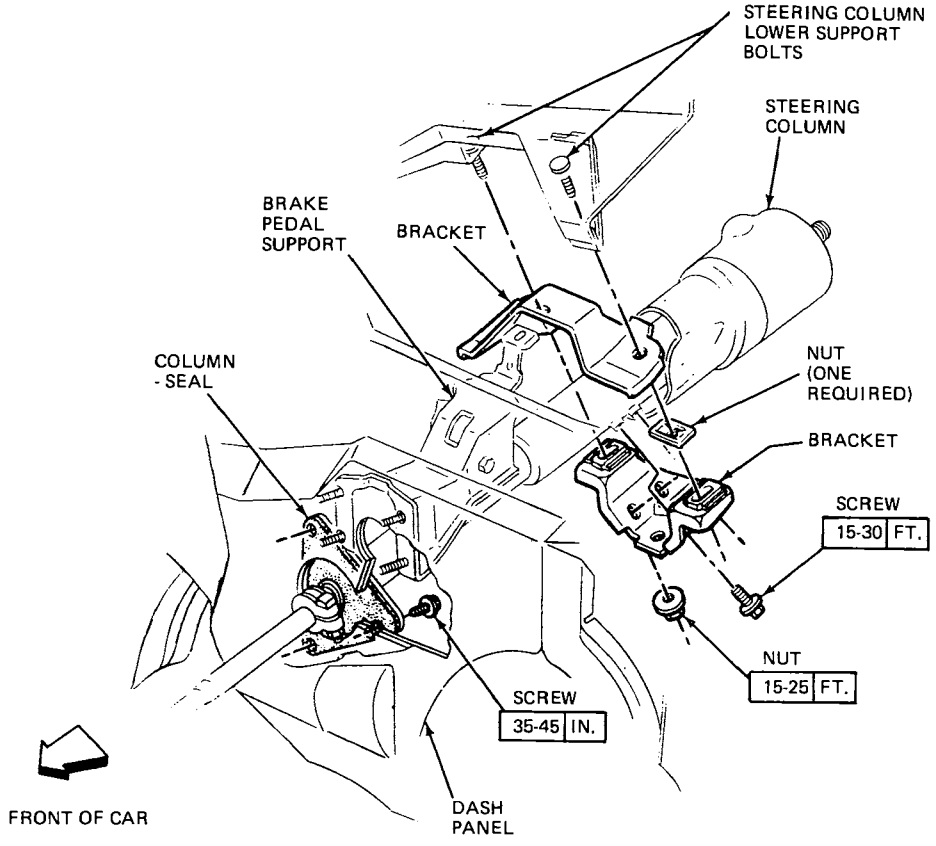


Figure 3G-14 - H Series Column Mounting

7. Remove the floor pan trim cover screws and remove the cover.

8. Remove the instrument panel trim cover screws and remove the trim cover.

9. Remove the transmission indicator cable, if so equipped. Figure 3G-19.

10. Move the front seat as far back as possible to provide maximum clearance.

11. Remove the two column bracket-to-instrument panel nuts and carefully remove from vehicle. Additional help should be obtained to guide the lower shift levers through the firewall opening. Figure 3G-20.

X Series Installation (Figure 3G-18)

1. If removed attach bracket (A) to jacket and install bolt (B) first, bolt (C) second and bolts (D) and (E) last. Tighten to specified torque.

2. Install ignition switch connector to ignition switch.

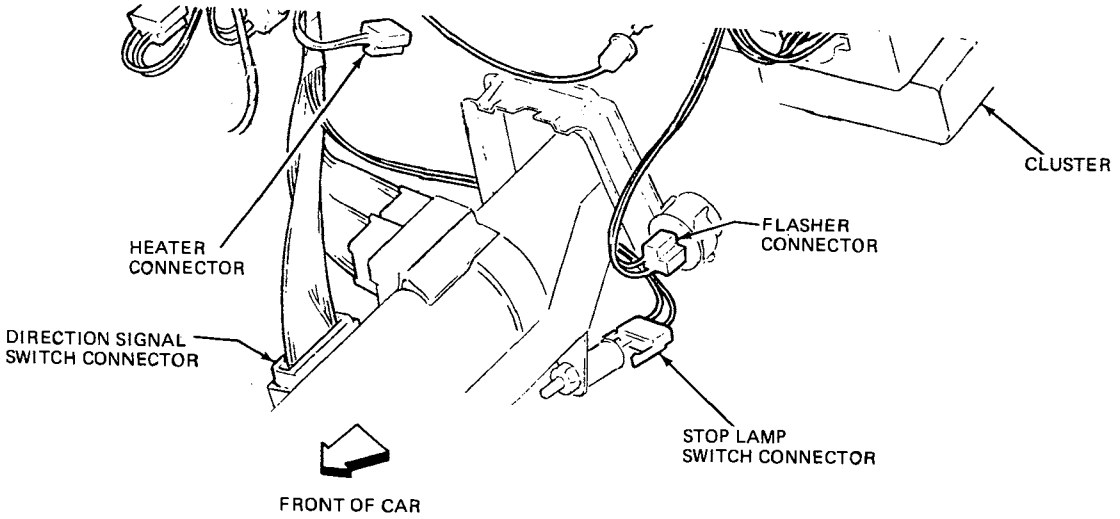


Figure 3G-15 - H Series Column Wiring

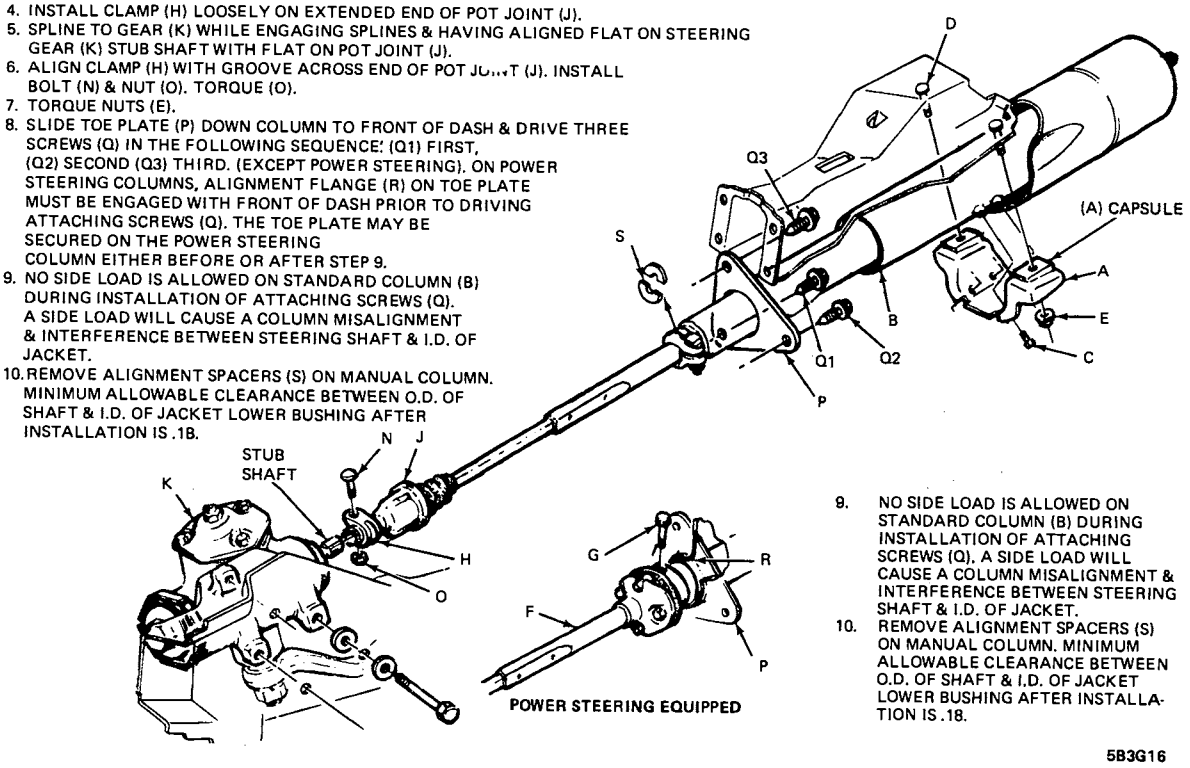


Figure 3G-16 - H Series Column Installation

3. Position column in the body and loose assemble capsule nuts (F) on studs.

4. Position cover and seal (G) to front of dash and install screw (H) at net location and tighten to specified torque.

5. Tighten capsule nuts (F) to specified torque.

6. Install screws (J) at slotted locations and tighten to specified torque.

CAUTION: *After the steering column is installed in the body, the lower shaft protruding through the toe pan must be protected from impacts or other damage.*

Intermediate shaft to rag joint.

7. Position flange of intermediate shaft to the rag joint and install lockwashers (K) and nuts (L). Tighten nuts to specified torque.

8. Leave intermediate shaft in retracted position.

CAUTION: *After the intermediate shaft is installed to the rag joint, it must be protected from damage before being installed to column.*

9. Lock steering column in straight ahead position and align front wheels in straight ahead position prior to body drop.

10. Position the pot joint bolt (M) so the nut (N) is against the clamp.

CAUTION: *Do not substitute any bolt or nut for this application. Do not reuse nut after being torqued.*

11. Remove the protective cap, but do not remove plastic spacers from column.

12. Install pot joint over steering column lower shaft using the pot joint clamp pointer and column shaft paint stripe to establish proper radial alignment.

13. Push pot joint clamp bolt head in against the clamp and torque nut (N) to specifications. Special tool may be used to hold bolt head against clamp while torquing nut.

14. Remove plastic spacers (P) from steering column lower shaft.

15. Rag joint must not be distorted beyond specifications. See view A (Figure 3G-18).

16. Pot joint must be correctly aligned to ± 1 serration and securely fastened to steering shaft.

CAUTION: *The torque on nut (N) must be torqued to 35 to 55 ft. lbs.*

17. Pot joint clamp nut must show a minimum of 1 bolt thread protruding from it.

18. The steering column splines visible above the pot joint clamp must be less than 1/4 inch.

19. Install the transmission indicator cable on column automatics. Figure 3G-19.

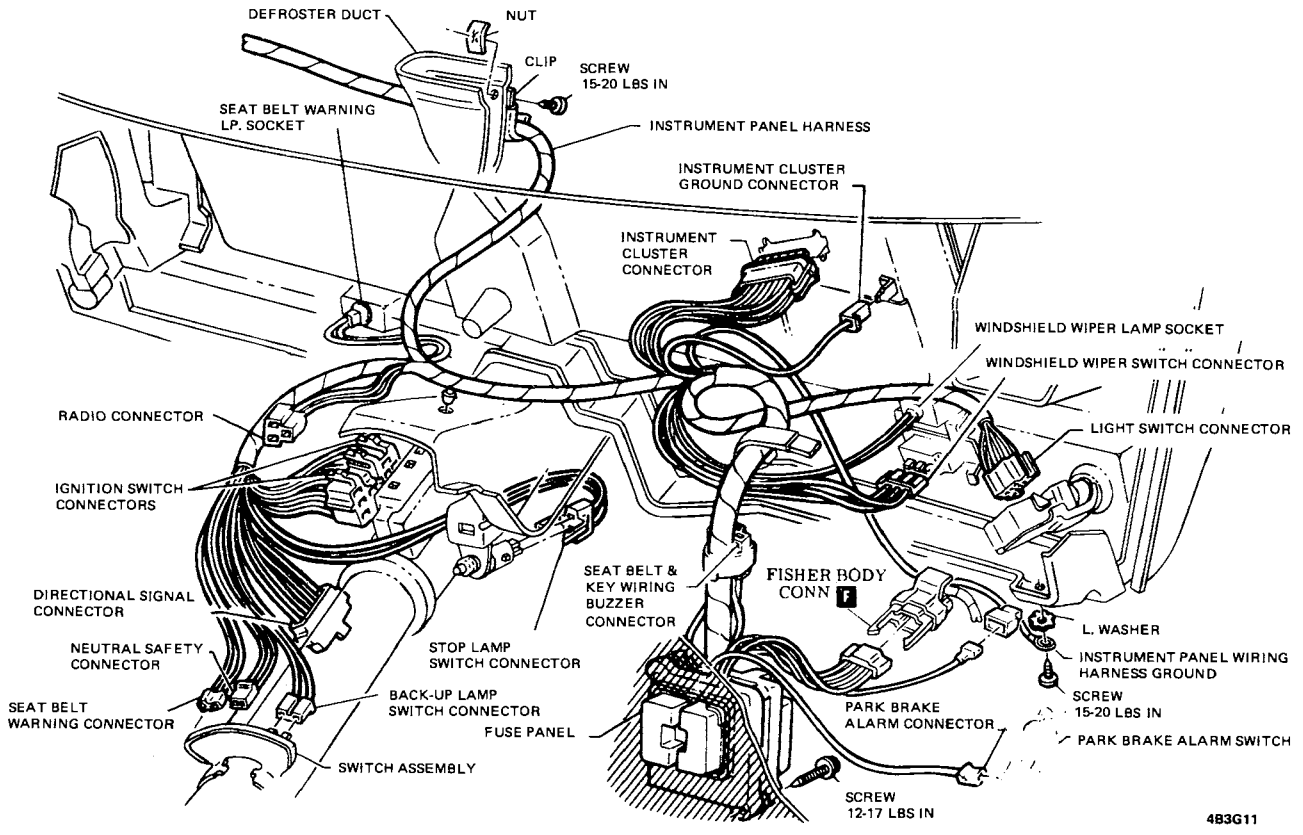


Figure 3G-17 X Series Steering Column Wiring

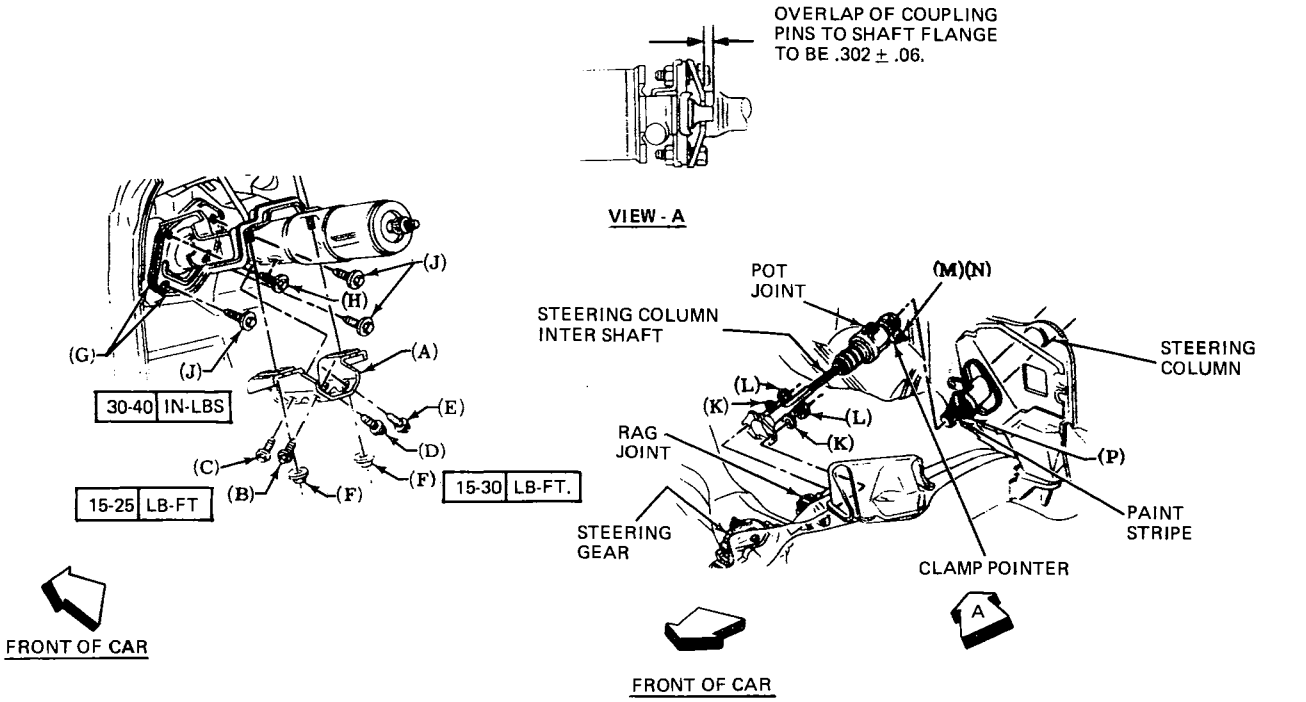
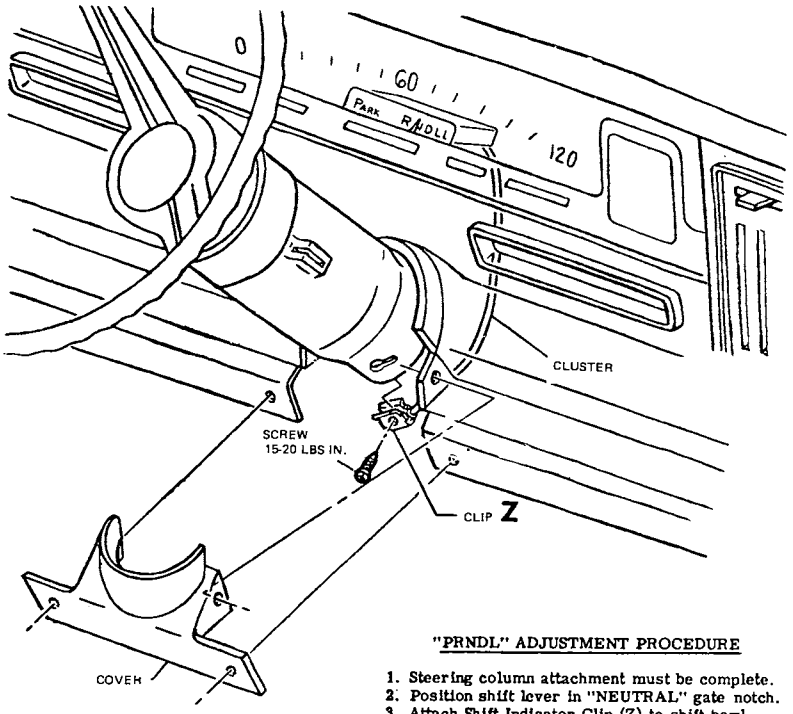


Figure 3G-18 X Series Steering Column Mounting



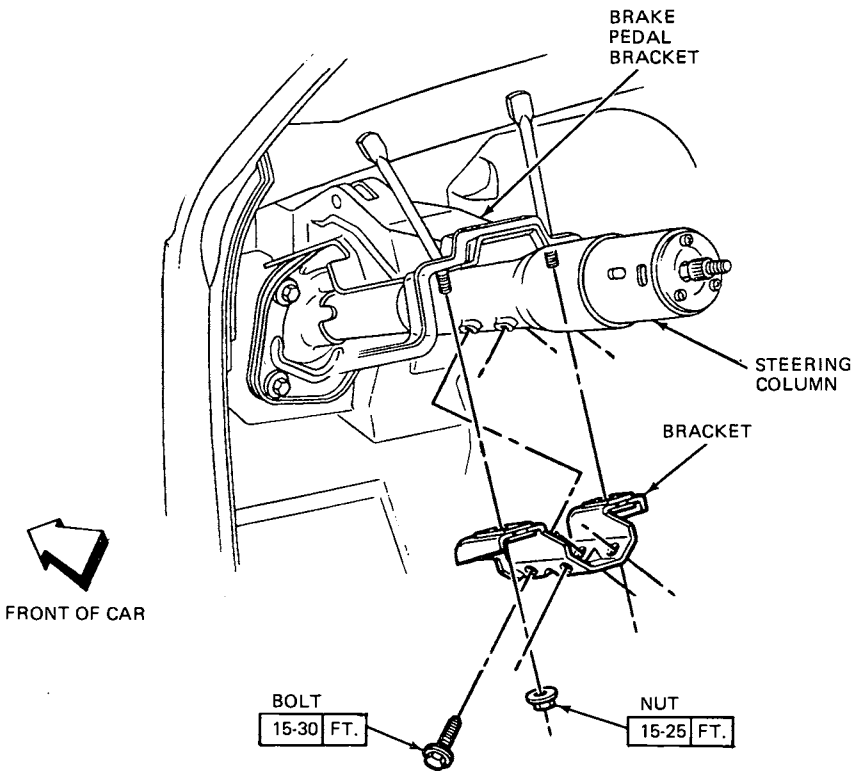
"PRNDL" ADJUSTMENT PROCEDURE

1. Steering column attachment must be complete.
2. Position shift lever in "NEUTRAL" gate notch.
3. Attach Shift Indicator Clip (Z) to shift bowl.
4. Move Clip (Z) in slot on shift bowl to centrally positioned pointer on "N" (NEUTRAL).
5. Tighten screw as specified.

Shift indicator should be adjusted prior to transmission control linkage adjustment.

4B3G13

Figure 3G-19 X Series Transmission Indicator Cable



5B3G20

Figure 3G-20 X Series Column to Dash Mounting

20. Reconnect column wiring and install the instrument *panel trim cover.*

21. Connect the transmission control linkage.

22. Install coupling shield.

23. Install the steering wheel.

24. Connect the battery ground cable.

Removal A Series

1. Remove the plastic cover to reveal the flex coupling and remove the two nuts securing the halves of the flex coupling together. Figure 3G-21.

2. Disconnect shift linkage from shift lever(s).

3. Remove screws attaching the lower cover or lower cover halves to the floor and loosen the cover. See Figure 3G-22.

4. Disconnect the shift indicator linkage. See Figure 3G-23.

5. Remove the lap cooler assembly if equipped.

6. Remove the two nuts, securing the column to the upper support sprocket guide and carefully lower the column. Remove bracket if necessary. See Figure 3G-24.

7. Disconnect all electrical connections from column and remove the column. See Figure 3G-25.

Installation A Series

1. Assemble the lower cover to the steering column seal with the projections provided on the seal and loosely clamp the upper and lower halves of the lower cover plate to the column with the two clamp screws. See Figure 3G-22.

2. If removed from column attach the steering column support bracket to the column by first installing a bolt loosely in the No. 1 hole (Figure 3G-24) and then another bolt loosely in the No. 2 hole. Install the two remaining bolts in the slots on the opposite side and torque bolts 2 and 3 to specifications prior to tightening bolts 1 and 4.

3. Position the column in the body and line up the flexible coupling (rag joint) to install the lock washers and nuts. The nuts may be tightened to specifications at any time. DO NOT install the joint cover at this time.

4. Position the column to the upper support bracket and guide and retain with the two nuts A and B as shown in Figure 3G-24.

5. Position the lower cover plate assembly to the bulkhead and start No. 1 screw. See Figure 3G-22.

6. Start screw No. 2 in the lower slot. Install screws 3 and 4 in their respective locations and tighten to specifications.

7. Tighten No. 7 clamp screw to specified torque before torqueing No. 8 clamp screw.

8. Install the two remaining cover screws (5 and 6) and torque to specifications.

9. Tighten the two steering column lower support brackets to guide bracket nuts (A and B in Figure 3G- 24) to specified torque.

10. Connect the shift indicator linkage and install the lower dash cover and lap cooler.

11. Install the coupling shield Figure 3G-21.

Removal B-C-E Series With Air Cushion Restraint

1. Disconnect A.C.R.S. by turning ignition switch to "Lock" position. Disconnect the negative battery cable from the battery and tape end of cable to insulate it.

2. Remove the flex coupling shield Figure 3G-21 and the two flex coupling to gear nuts.

3. Disconnect shift linkage from shift tube lever at lower end of column.

4. Remove the drivers module and steering wheel as outlined in this section.

5. Disconnect the parking brake release cover.

6. Pull column collar up and out of way, then remove the I.P. lower cover trim plates. Figure 3G-26.

7. Remove the 8 screws that secure the lower left and right I.P. cover. Figure 3G-27.

8. Disconnect the shift indicator cable. Figure 8G-28.

9. Remove toe pan trim cover, remove screws holding toe pan cover to floor and loosen cover. Figure 3G-29.

10. Remove the knee restraint brace Figure 3G-30.

11. Remove the two bolts that secure the lower clamp and remove clamp. Also remove the two bracket nuts. Figure 31. Lower column and disconnect ignition switch wiring.

12. Disconnect all column wiring. Figure 3G-32.

13. Carefully remove column from car.

Installation B-C-E Series With Air Cushion Restraint

1. If column upper support was removed (Figure 3G-31) position bracket "B" in place, install guide bracket "C" to body.

2. Shim "D" as required to fill gap between guide bracket and body.

3. Install screw "E" and torque.

4. Install screw "F" and torque.

Refer to Figure 3G-33, during the following steps:

1. Install ignition switch connector "A" to ignition switch.

2. Position column and position the flange to the steering coupling and install lock nuts and washers. Tighten to specified torque. Figure 3G-33 Also install coupling shield Figure 3G-21.

3. Loosely assemble nuts "B" at instrument panel.

4. Position floor cover "C" to dash using starting screw "D" in round net hole.

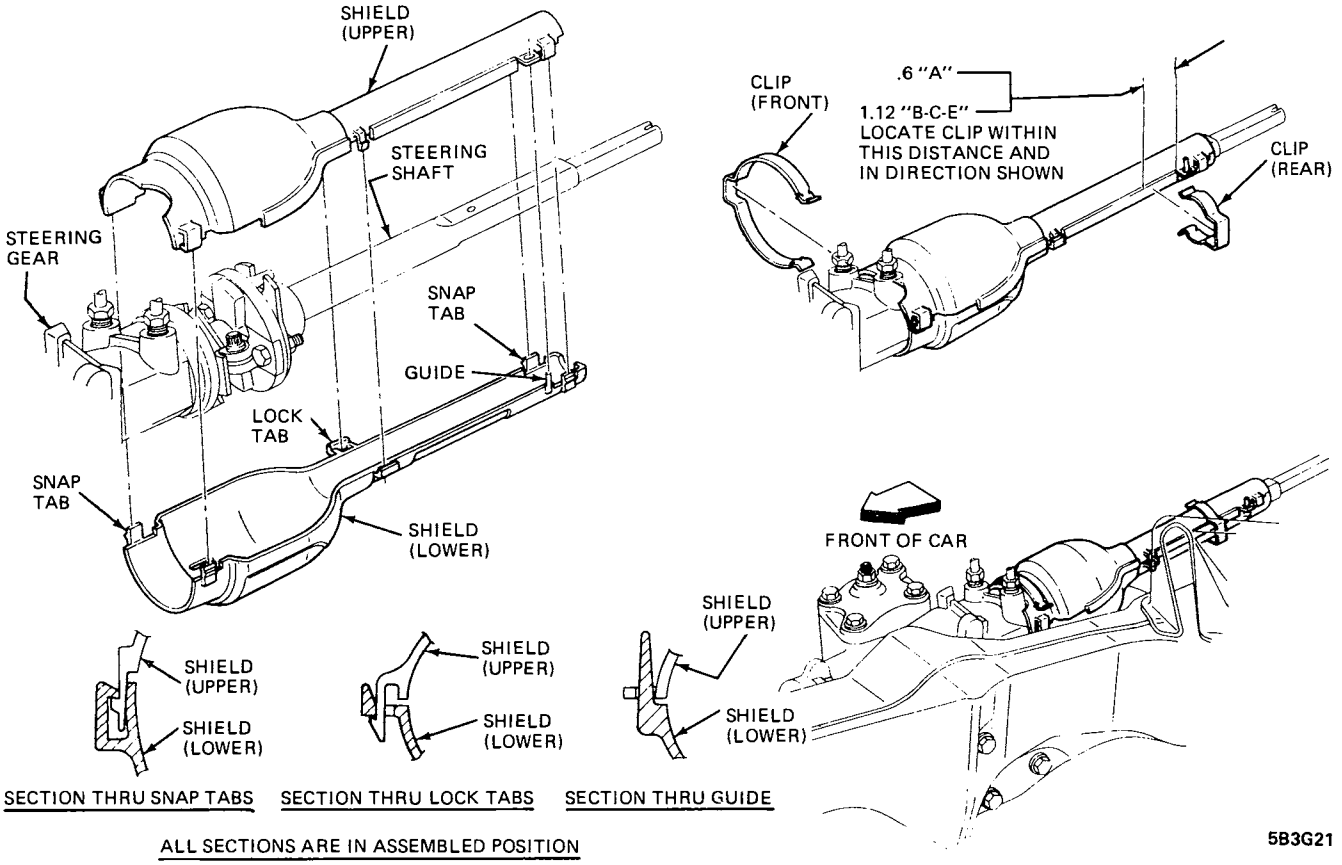


Figure 3G-21 Steering Coupling Shield A-B-C-E

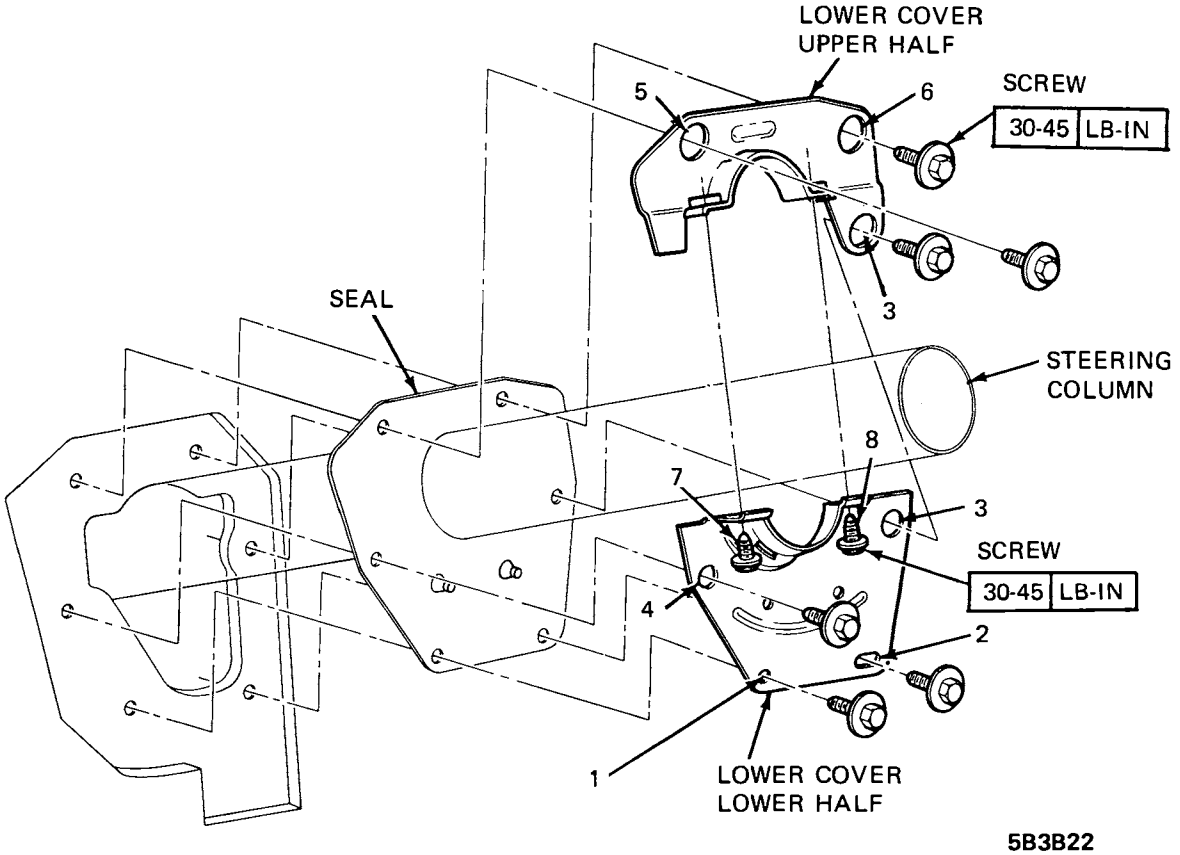
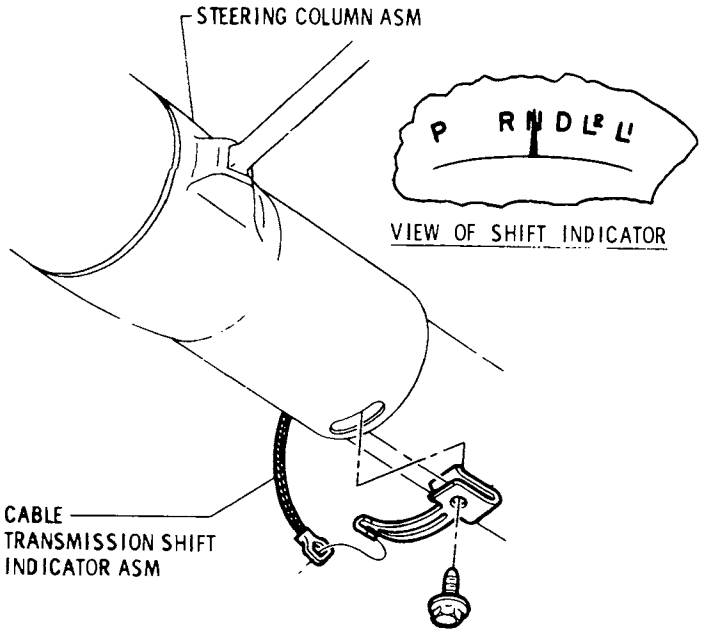


Figure 3G-22 A Series Steering Column Lower Cover



1. STEERING COLUMN ATTACHMENT MUST BE COMPLETE.
2. POSITION SHIFT LEVER IN NEUTRAL GATE NOTCH.
3. ATTACH SHIFT INDICATOR CLIP TO CABLE.
4. MOVE CLIP IN SLOT ON SHIFT BOWL TO CENTRALLY POSITION POINTER ON "N" (NEUTRAL).
5. TIGHTEN SCREW AS SPECIFIED

NOTE: SHIFT INDICATOR SHOULD BE ADJUSTED PRIOR TO TRANSMISSION CONTROL LINKAGE ADJUSTMENT. (COLUMN SHIFT)

NOTE: CRIMP END OF CLIP OVER CABLE.

3G-6

Figure 3G-23 A Series Shift Indicator

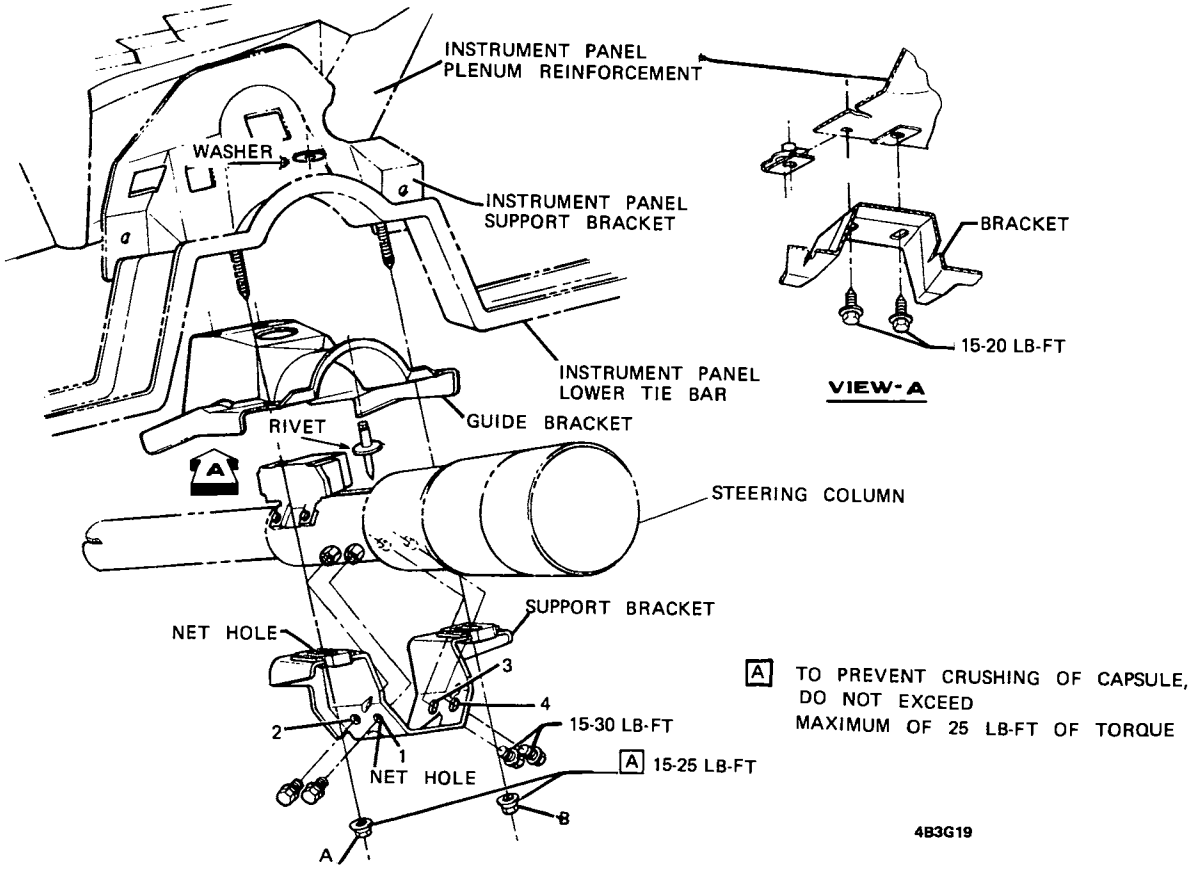


Figure 3G-24 A Series Steering Column Installation

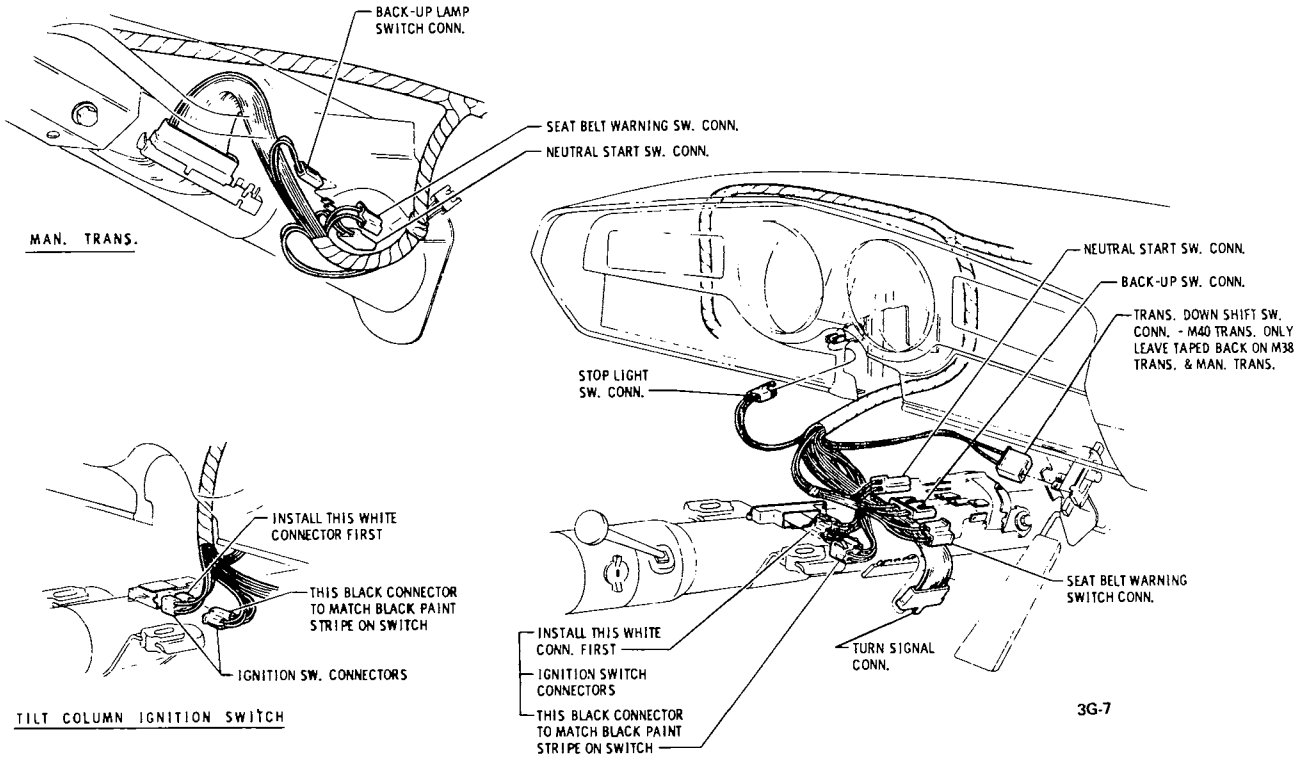


Figure 3G-25 A Series Steering Column Wiring

5. Install screw "E" and torque. Tighten screw "D" and torque and install remaining floor cover screws to specified torque.

6. Loosely assembly lower clamp "F" to guide bracket by starting screw "G" in guide bracket weld nut.

7. Install screw "H" and tighten to specified torque tighten screw "G" to specified torque.

8. Tighten nuts "B" to specified torque.

9. Connect harness connector to sensor and column wiring. Figure 3G-32.

10. Connect the transmission indicator cable. Figure 3G-28.

11. Install the knee restraint brace. Figure 3G-30.

12. Install the lower left I.P. cover. Figure 3G-27.

13. Install the lower cover trim plates. Figure 3G-26.

14. Connect the parking brake lever.

15. Install the drivers module and steering wheel as outlined in this section.

16. Reconnect the shift linkage at the shift tube.

17. Reconnect the battery negative cable.

18. Rotate the ignition switch to any position but lock and check that the restraint indicator light operates correctly.

Removal B-C-E Series - Non Air Cushion Restraint

1. Disconnect battery negative cable and remove flex coupling shield. See Figure 3G-21. Remove two nuts securing halves of flexible coupling together. Figure 3G-34.

2. Disconnect shift linkage from shift tube.

3. Remove screws securing toe pan cover to floor and loosen cover. Figure 3G-34.

4. Disconnect shift indicator link. See Figure 3G-28.

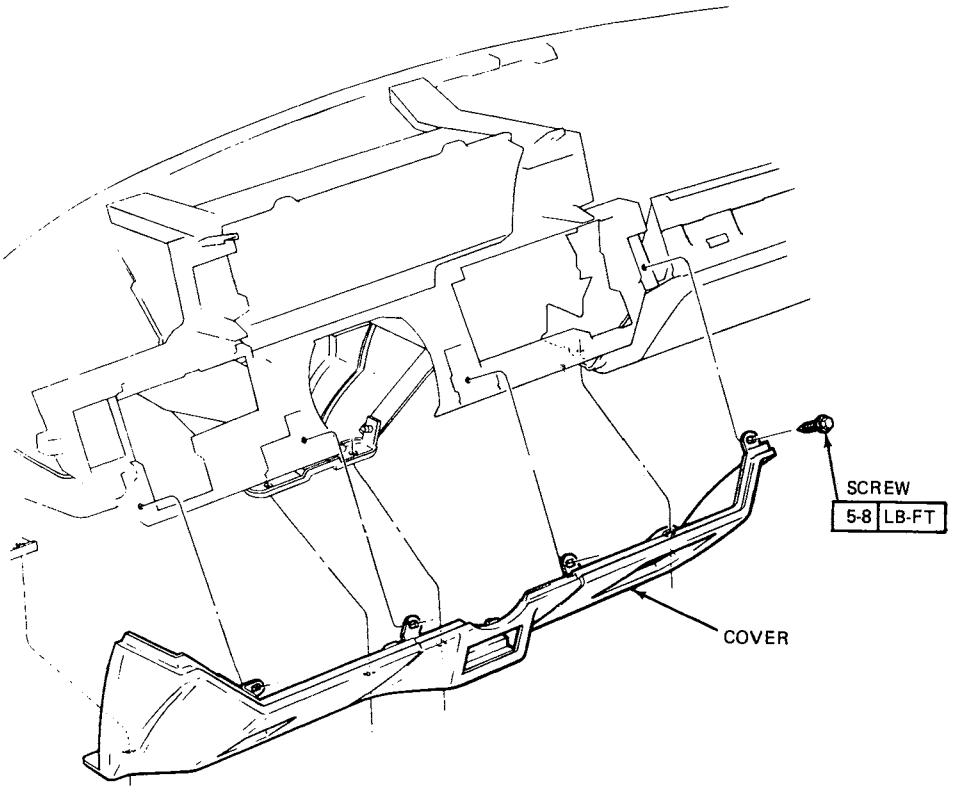
5. Remove nuts securing bracket to instrument panel and carefully lower column. See Figure 3G-34.

6. Disconnect all electrical connectors from steering column assembly and carefully withdraw column. See Figure 3G-32.

Installation B-C-E Series - Non Air Cushion Restraint

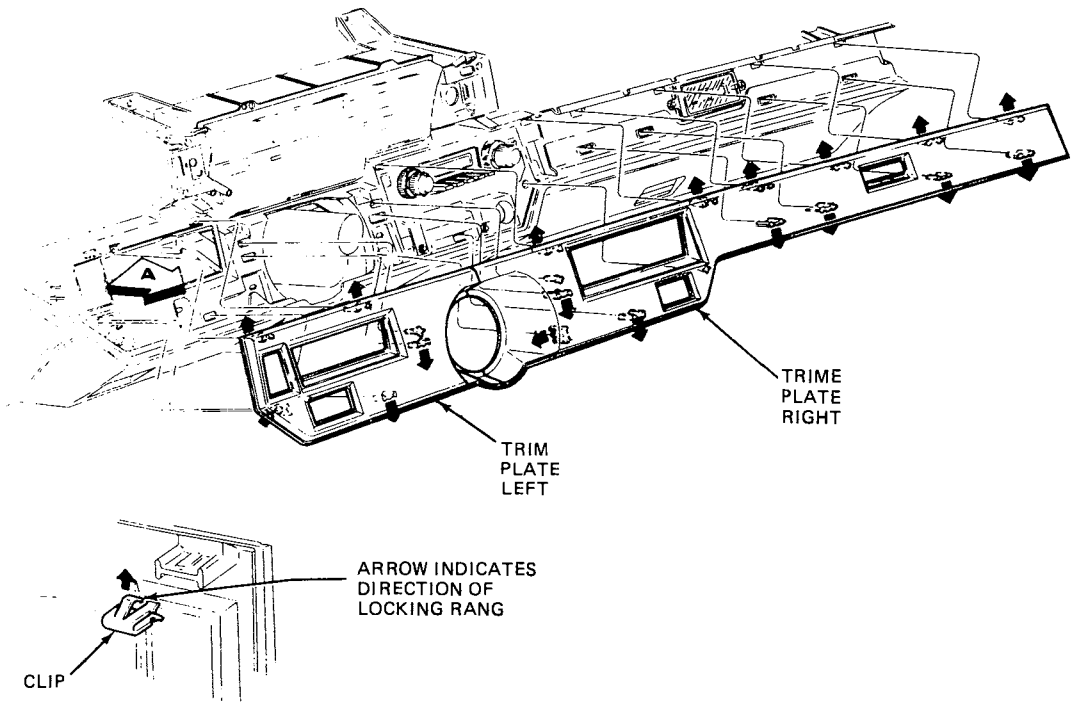
It is mandatory that the installation procedure be followed in exact sequence.

> **CAUTION:** *Fasteners in the following steps are important attaching parts in that they could affect the performance of vital components and systems, and/or could result in major repair expense. It must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part or lesser quality or substitute*



5B3G26

Figure 3G-26 B-C-E Series Lower I. P. Cover - A.C.R.S.



5B3G27

Figure 3G-27 B-C-E Series Lower Left and Right I.P. Covers - A.C.R.S.

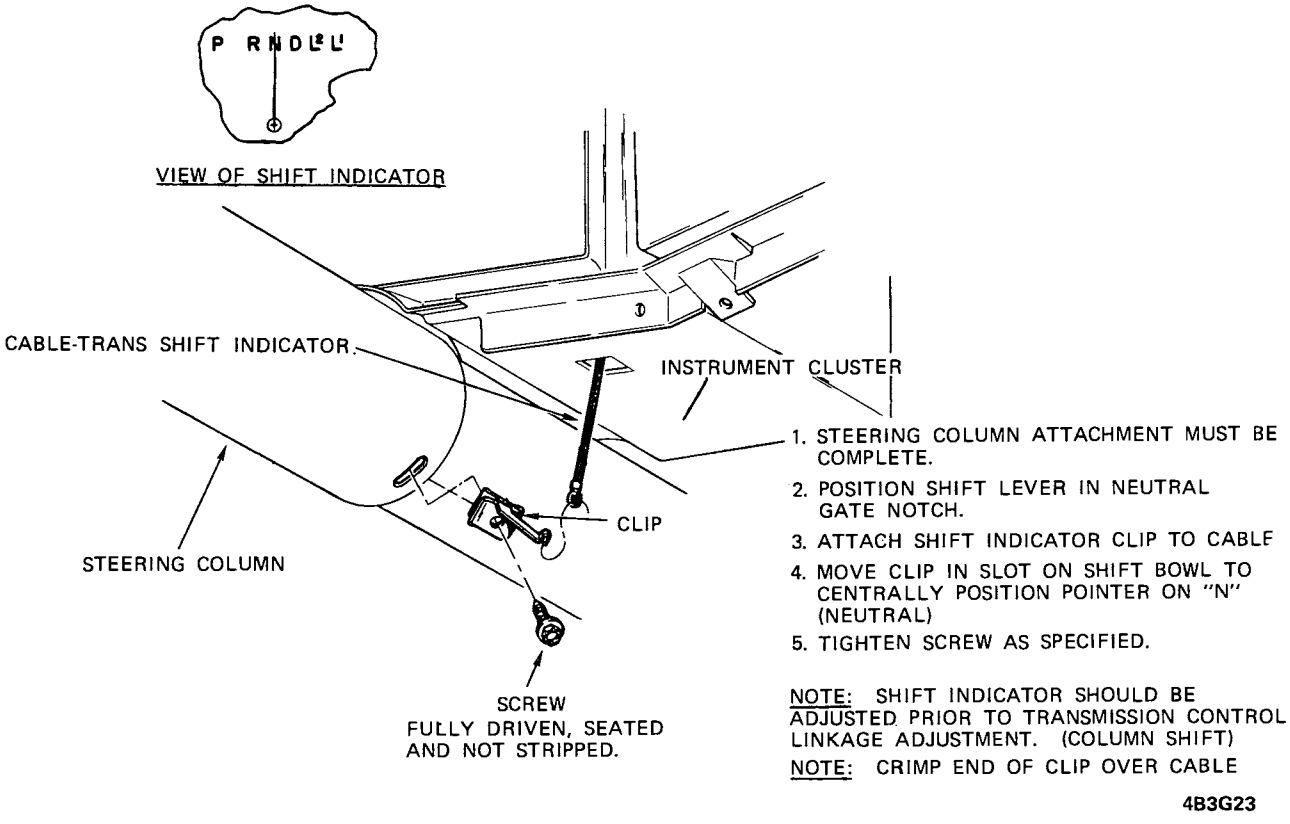


Figure 3G-28 B-C-E Series Transmission Indicator Cable

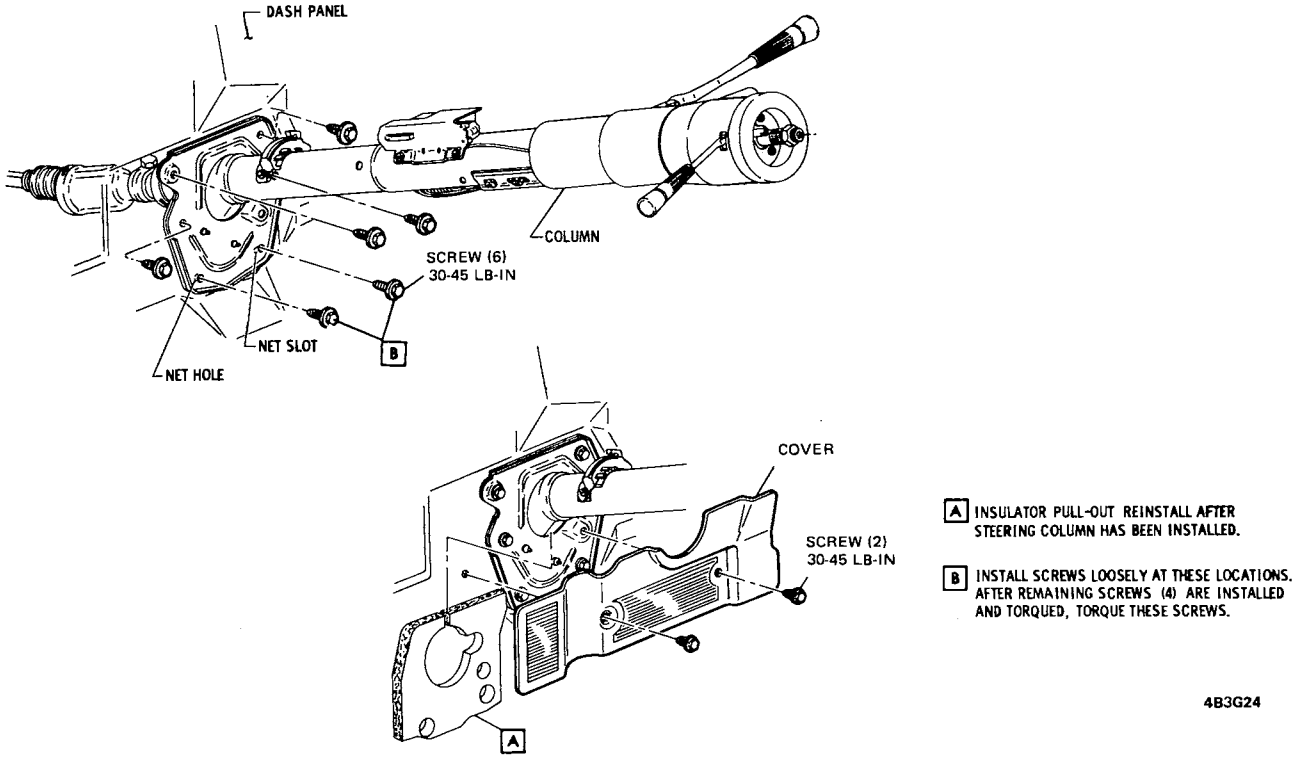


Figure 3G-29 B-C-E Series Steering Column To Dash - A.C.R.S.

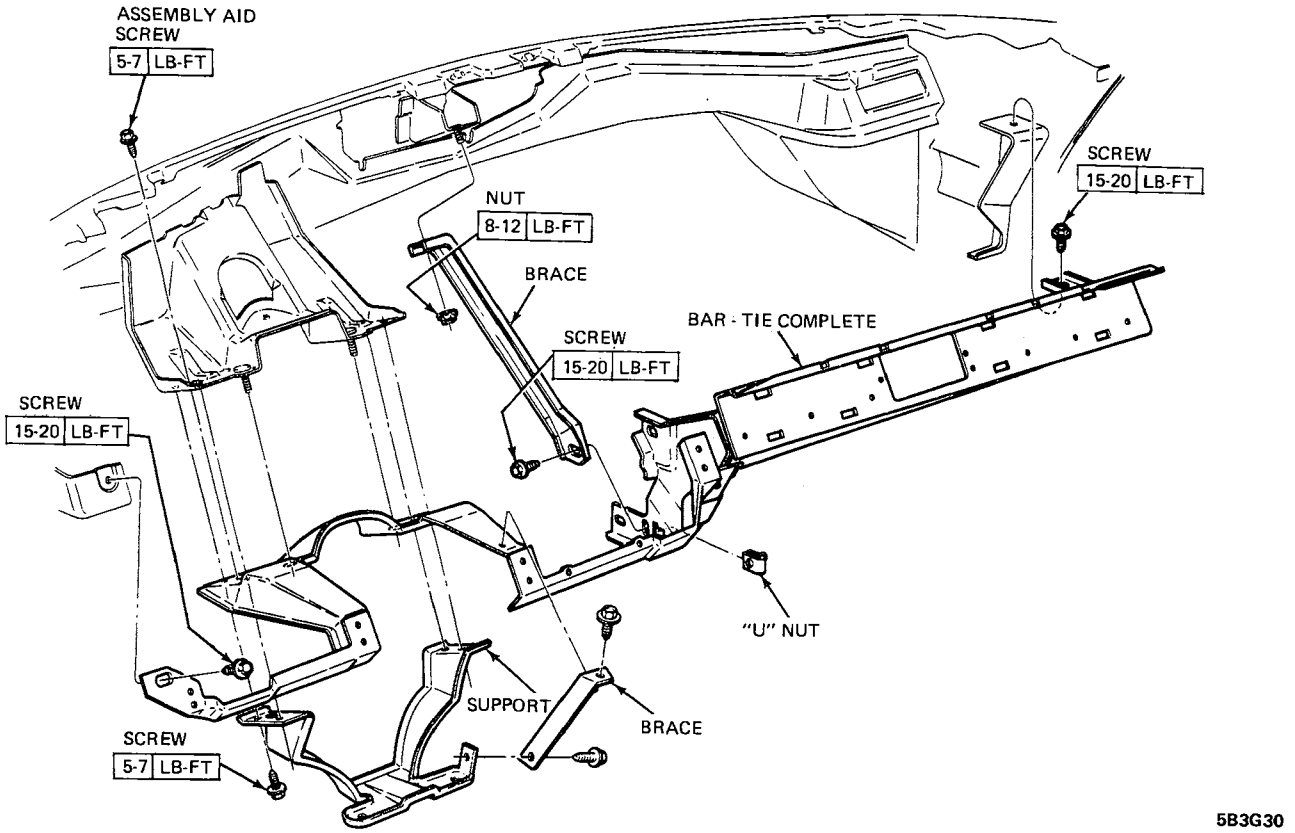


Figure 3G-30 B-C-E Series Knee Restraint Brace - A.C.R.S.

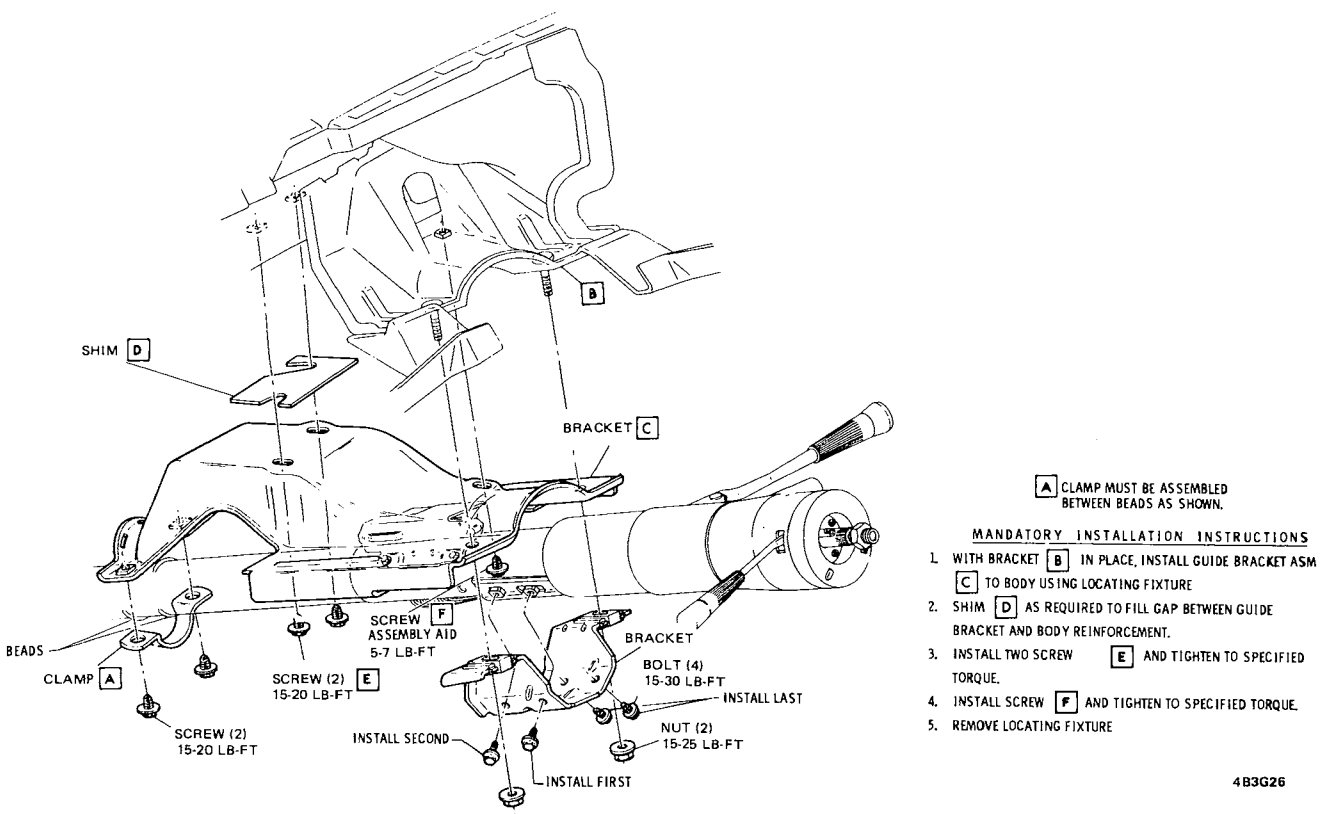


Figure 3G-31 B-C-E Series Steering Column Mounting - A.C.R.S.

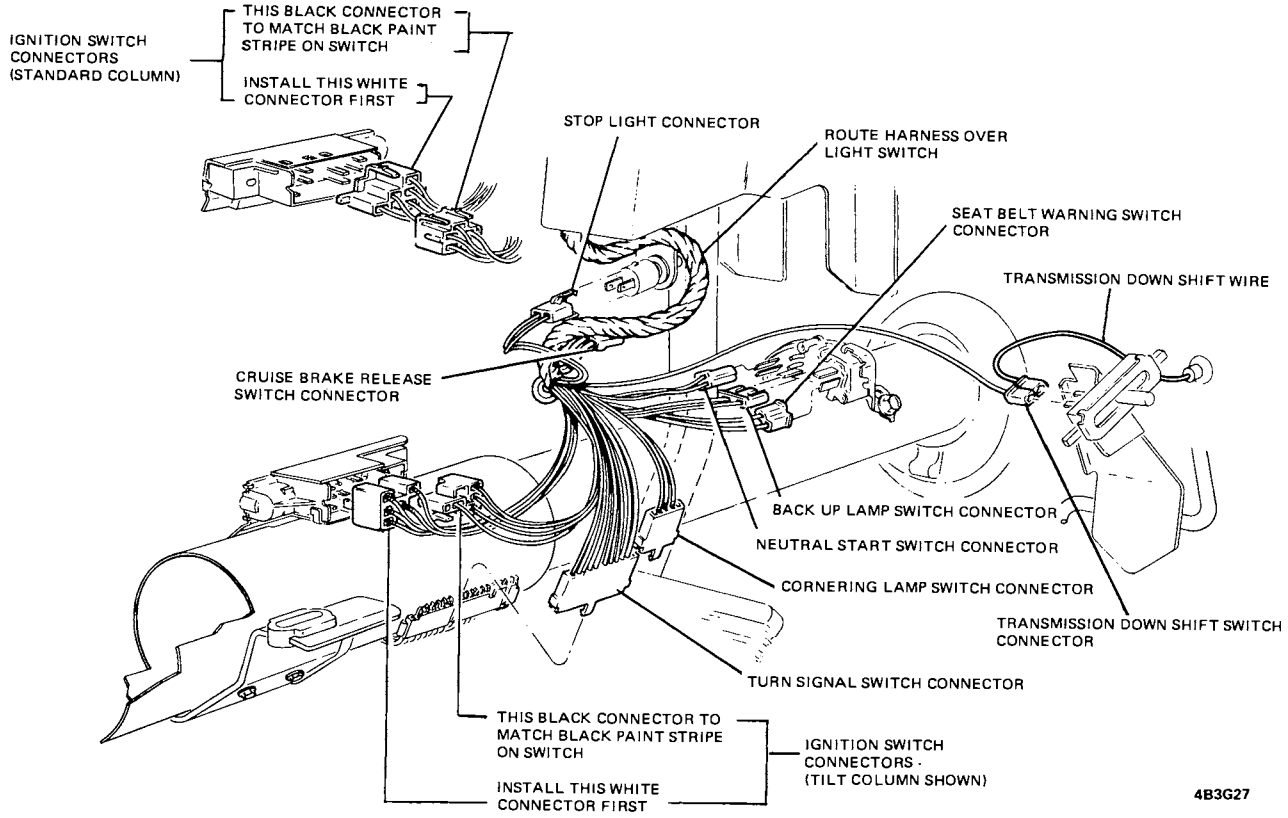
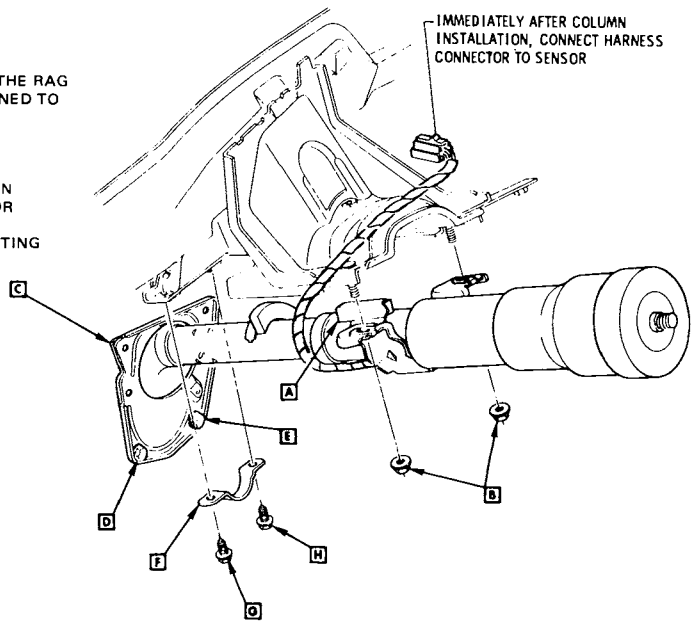


Figure 3G-32 B-C-E Series Column Wiring - All

1. INSTALL IGNITION SWITCH CONNECTOR [A] TO IGNITION SWITCH.
2. POSITION COLUMN IN THE BODY AND POSITION THE FLANGE TO THE RAG JOINT AND INSTALL LOCK WASHERS AND NUTS. (MAY BE TIGHTENED TO SPECIFIED TORQUE AT ANY TIME).
3. LOOSE ASSEMBLE NUTS [B] AT THE INSTRUMENT PANEL
4. POSITION FLOOR COVER [C] TO DASH USING BENCH AWL OR BY STARTING SCREW [D] IN ROUND NET HOLDE.
5. INSTALL SCREW [E] AND TIGHTEN TO SPECIFIED TORQUE. TIGHTEN SCREW [D] TO SPECIFIED TORQUE AND INSTALL REMAINING FLOOR COVER SCREWS TO SPECIFIED TORQUE.
6. LOOSE ASSEMBLE LOWER CLAMP [F] TO GUIDE BRACKET BY STARTING SCREW [G] IN GUIDE BRACKET WELD NUT.
7. INSTALL SCREW [H] AND TIGHTEN TO SPECIFIED TORQUE. TIGHTEN SCREW [G] TO SPECIFIED TORQUE
8. TIGHTEN TWO NUTS [B] TO SPECIFIED TORQUE.
9. CONNECT HARNESS CONNECTOR TO SENSOR

TORQUE VALVES ARE SHOWN IN FIGURES 3G-24 and 3G-26



MANDATORY SYSTEM REQUIREMENTS

IF THESE REQUIREMENTS CANNOT BE MET, IT MUST BE CORRECTED.

A. POT JOINT OPERATING ANGLE MUST NOT EXCEED 15° MAXIMUM.
B. TRAVEL OF THE SLIDING INTERMEDIATE SHAFT MUST NOT EXCEED +1.0 IN. FROM THE NOMINAL LOCATION.
C. RAG JOINT MUST NOT BE DISTORTED GREATER THAN ± .060 DUE TO SLIDING SHAFT BOTTOMING IN EITHER DIRECTION. SEE VIEW A.

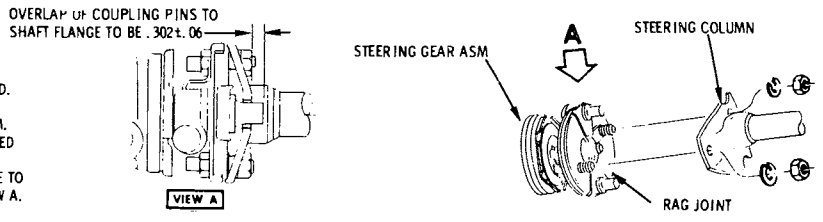


Figure 3G-33 B-C-E Series Column Installation - A.C.R.S.

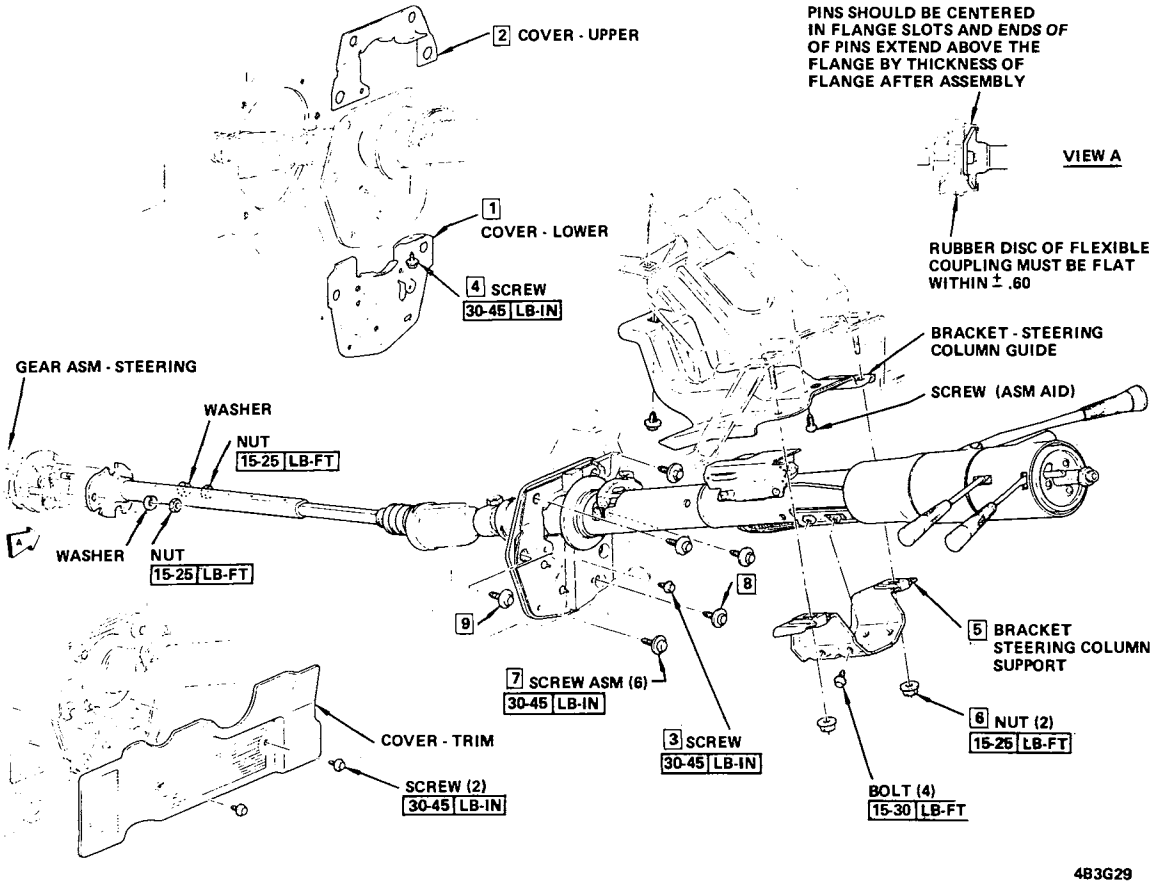


Figure 3G-34 B-C-E Series Column Mounting - Non A.C.R.S.

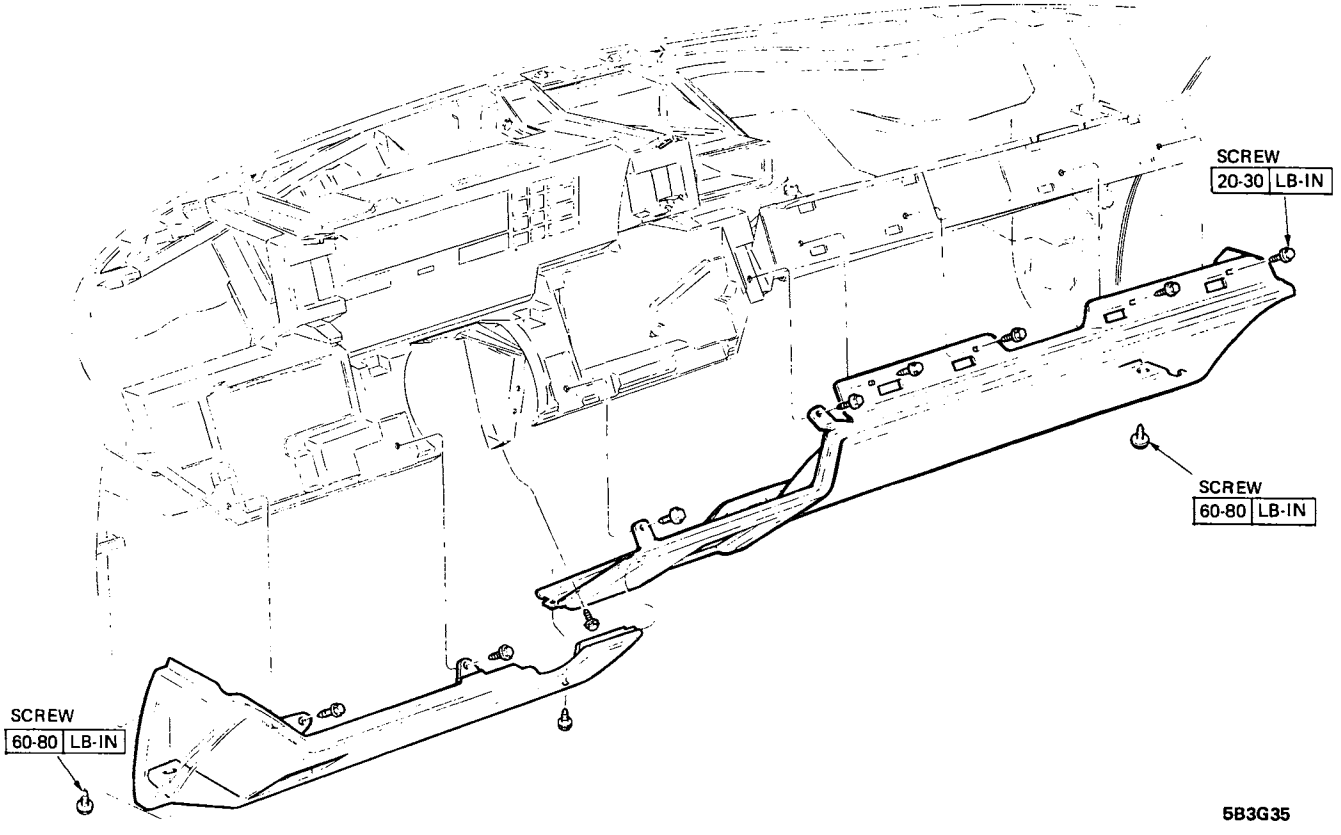


Figure 3G-35 B-C-E Series Lower I. P. Cover - Non A.C.R.S.

design. Torque values must be used as specified during reassembly to assure proper retention of this part.

When installing a new tilt and tilt telescoping column remove the Allen plug in the upper steering shaft. Plug is used only for shipping.

1. Position column in the body and position the flange to the rag joint and install lock washers and nuts and torque to specifications.

2. Connect all electrical connectors to steering column. See Figure 3G-32.

3. Position steering column to instrument panel loose assemble nuts and connect shift indicator link.

4. Position lower cover to dash by starting screw (7) in round inlet hole. See Figure 3G-34.

5. Install screw (8) and torque to 40 lb. in. Tighten screw (7) and torque to 40 lb. in.

6. Install screw (3) and (9) and torque to 40 lb. in.

7. Install clamp screw (4) and torque to 40 lb. in.

8. Install remaining three cover screws and torque to 40 lb. in.

9. Torque steering column to instrument panel nuts to 20 lb. ft.

10. Connect shift linkage to shift lever.

11. Reconnect battery negative cable.

DISASSEMBLY AND ASSEMBLY OF KEY RELEASE STANDARD COLUMN (H SERIES)

All elements of energy-absorbing columns are sensitive to damage and must be handled with care.

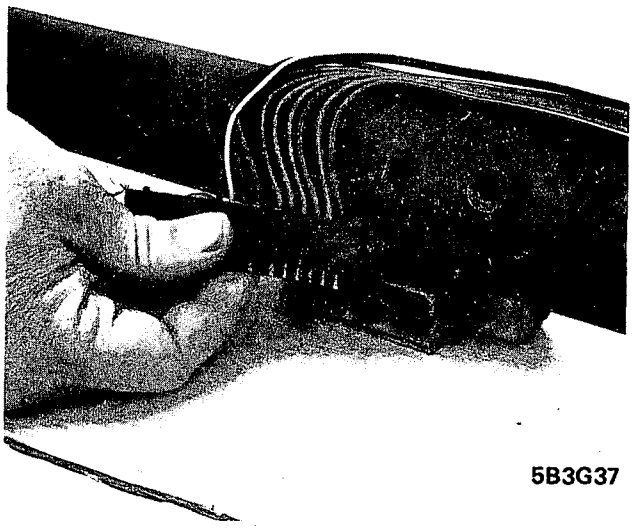
Disassembly - Upper End

1. Remove mounting bracket bolts(4) and mounting bracket. Figure 3G-36.

5B3G36

Figure 3G-36 - Removing Mounting Bracket

2. Unsnap switch connector from jacket bracket. Figure 3G-37.



5B3G37

Figure 3G-37 - Unsnap Connector from Bracket

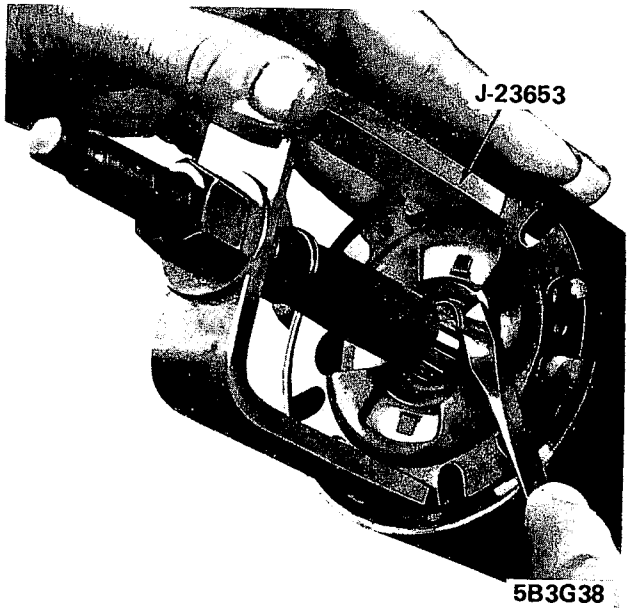
3. Unsnap wheel nut retaining ring and remove wheel nut. Remove steering wheel using standard wheel puller.

DO NOT HAMMER ON END OF STEERING SHAFT.

4. Remove three lockplate cover screws and lift cover off shaft.

5. Depress shaft lock with finger and pry retaining ring out of groove with screwdriver. Tool J-23653 can be used (Figure 3G-38), but the full load of the spring should not be relieved as then the ring would rotate making removal more difficult. Remove ring and lock plate.

CAUTION: *With column out of car and ring removed, shaft could slide out bottom of column causing damage to shaft.*



5B3G38

Figure 3G-38 - Removing Retaining Ring

6. Slide upper bearing preload spring and turn signal cancelling cam off upper steering shaft.

7. Slide thrust washer off upper steering shaft.

8. Remove turn signal lever screw and lever.

9. Push hazard warning switch in and unscrew knob.

10. Remove the three signal switch mounting screws. Pull the switch straight up (Figure 3G-39) being careful not to snag the the connector in the housing.

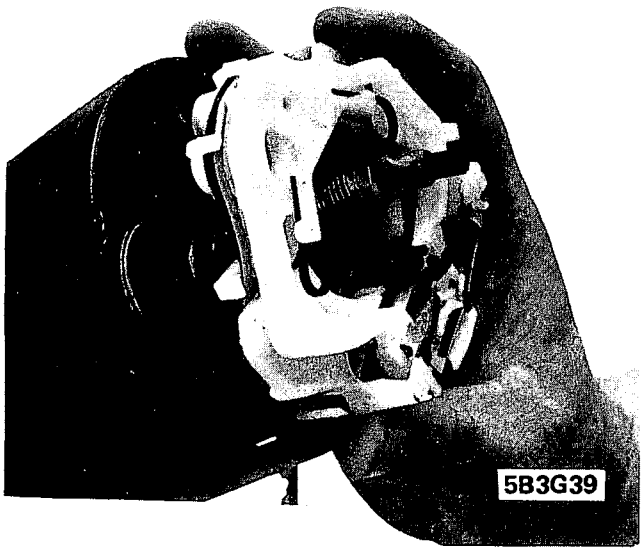


Figure 3G-39 - Remove Signal Switch

11. The lock cylinder should be removed in the "run" position.

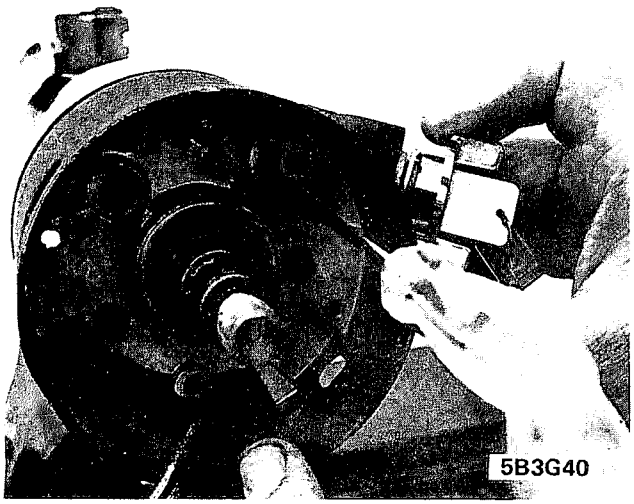


Figure 3G-40 - Removing Lock Cylinder

Insert a thin tool (small screw driver or knife blade) into the slot next to the switch mounting screw boss (right-hand slot) and depress retainer at bottom of slot, which releases lock. Remove lock. Figure 3G-40.

12. The buzzer switch can be pulled straight out of the housing. A "straightened" paper clip or similar piece of stiff wire with a hook bent on one end should be inserted in the exposed loop of the wedge spring, then a straight pull on the wire will remove both spring and switch. (If the lock cylinder is not removed before the switch, it must be in the "on" position) Figure 3G-41.

CAUTION: *If wedge spring is dropped on removal, it could fall into the column, requiring complete disassembly to retrieve spring.*

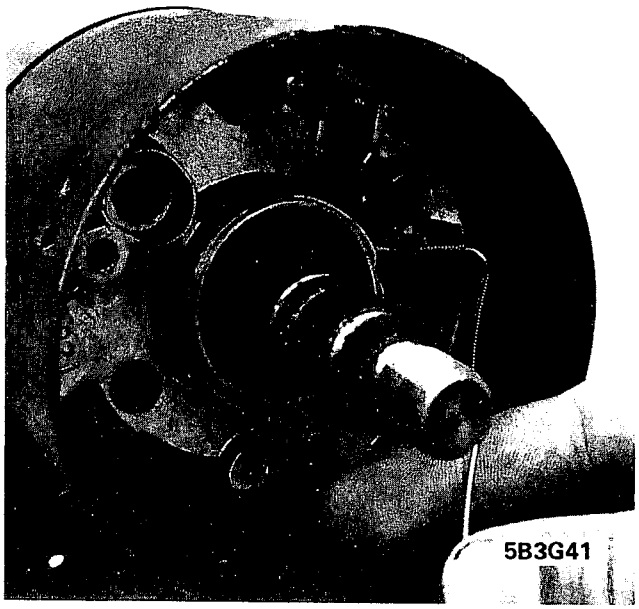


Figure 3G-41 - Removing Buzzer and Spring

Steps 1 thru 12 may be performed in the vehicle. If further disassembly is required, the column must now be removed.

13. Remove the ignition switch. Position the switch in the "off-unlocked" position by pulling on the actuator rod up

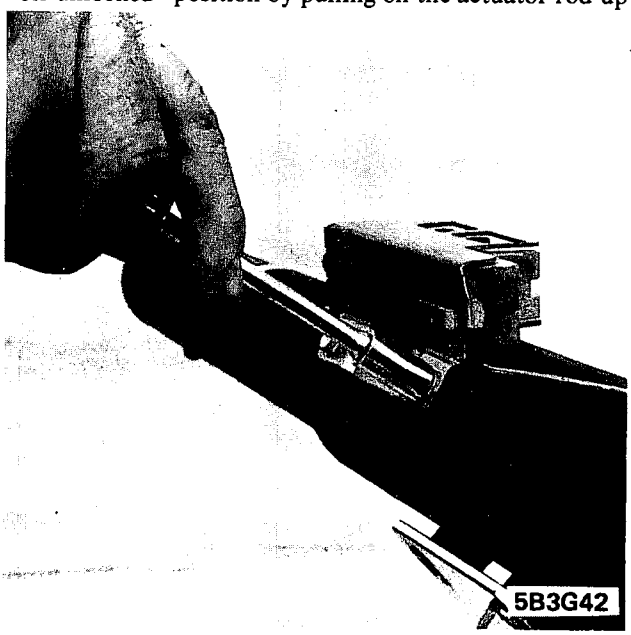


Figure 3G-42 - Removing Ignition Switch

to a definite stop. Remove the two attaching screws and then the switch. Figure 3G-42.

14. Remove the four hex head screws securing the housing and shroud assembly to the jacket. Pull assembly from jacket. Figure 3G-43.

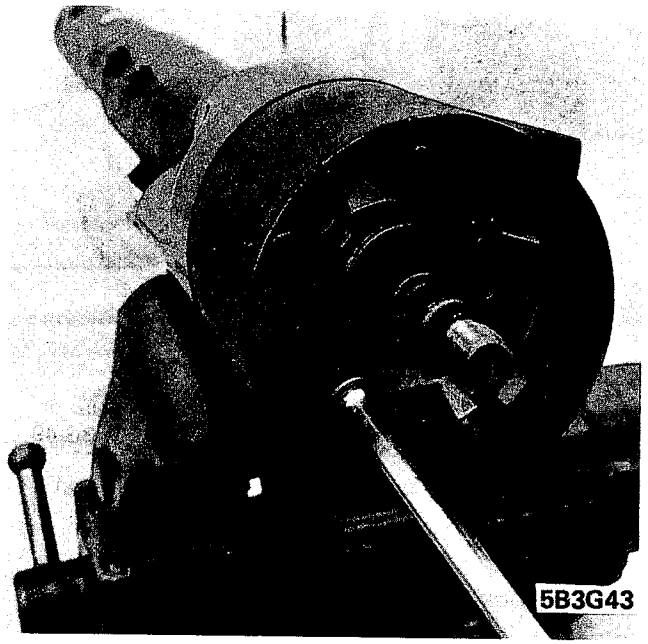


Figure 3G-43 - Removing Shroud

15. Separate actuator rod from rack.

16. Tip housing and shroud assembly upside-down. Remove three screws, separate shroud from housing (Figure 3G-44). Wave washer (Figure 3G-45) may separate from lever boss. If not, remove.

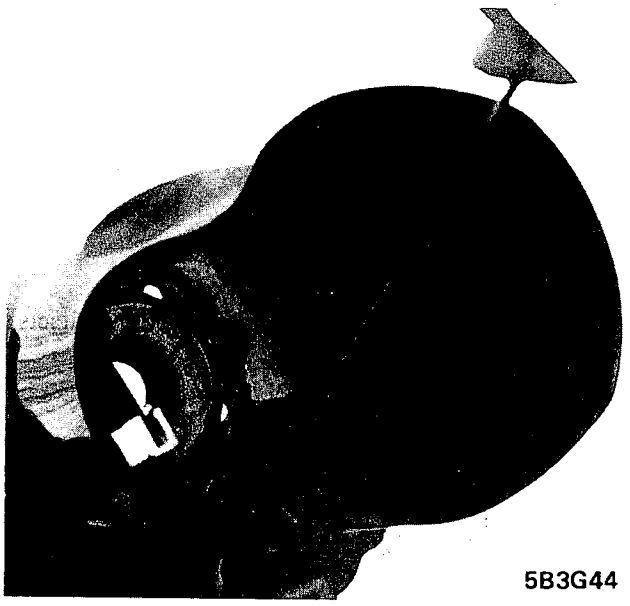


Figure 3G-44 - Removing Shroud to Bowl Screws

17. Remove back and lock bolt assembly. Figure 3G-46.

If required, pull rack away from lock bolt to separate.

18. Remove rack preload spring. Figure 3G-47.

Figure 3G-45 - Wave Washer Position

Figure 3G-46 Rack and Lock Bolt Removal

19. Remove the sector through the lock cylinder hole by pushing firmly on the block tooth of the sector with a blunt punch. Figure 3G-48.

20. Pull steering shaft out through bottom of the column.

Removal of the lower bearing or adapter is discouraged unless replacement of either is required. The bearing and adapter is serviced as an assembly.

21. If replacement is required, tap on adapter around the full diameter with hammer and punch (Figure 3G-49). It is not uncommon to destroy the adapter trying to remove it.

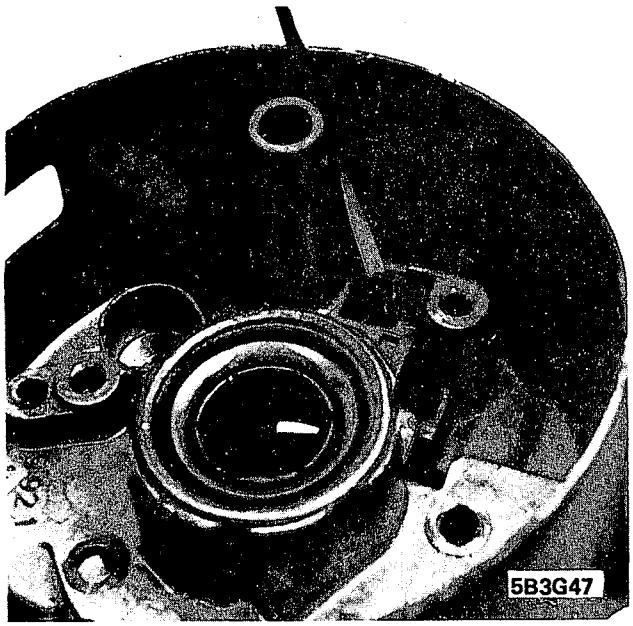


Figure 3G-47 - Rack Preload Spring Removal

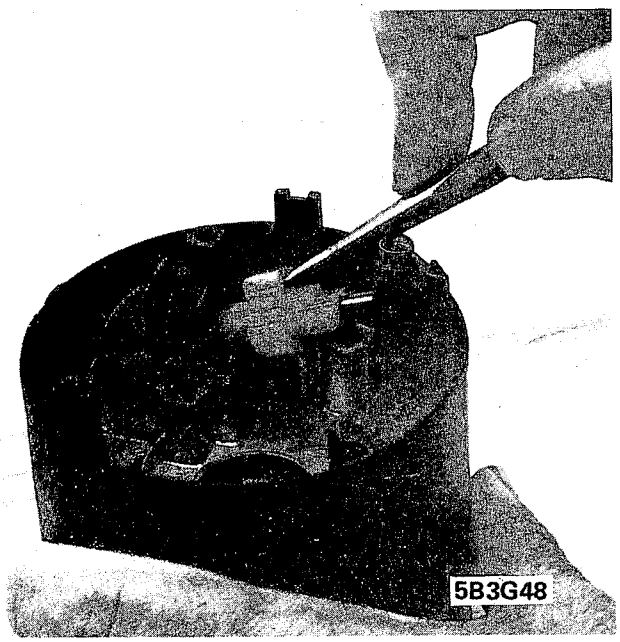


Figure 3G-48 - Sector Removal

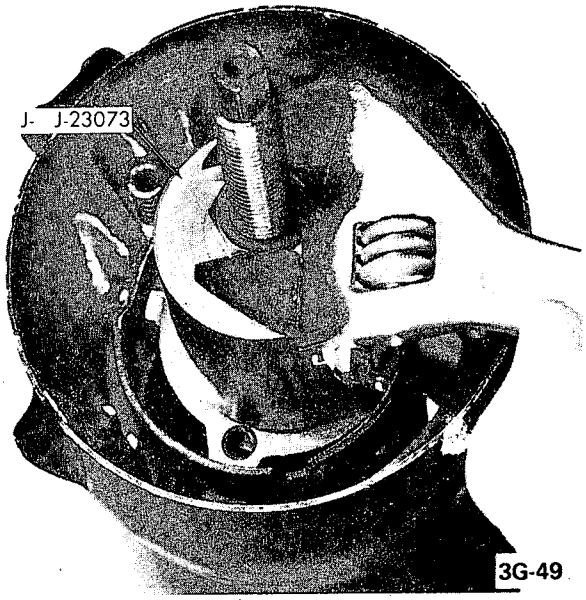


Figure 3G-49 - Lower Bearing Adapter Removal

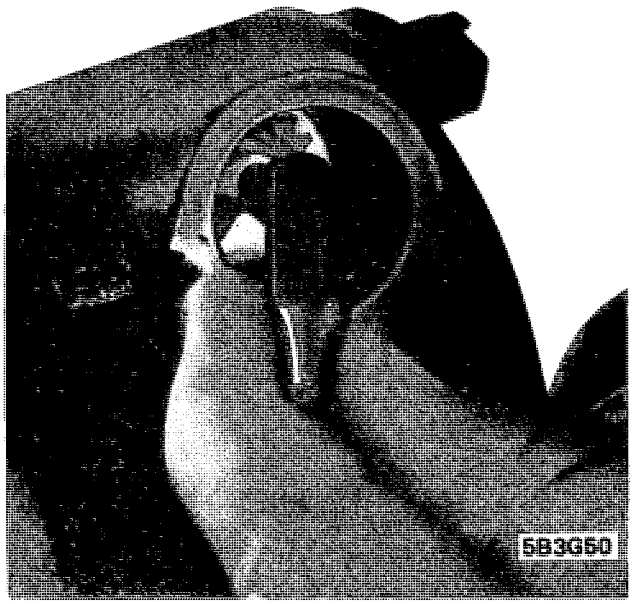


Figure 3G-50 - Installing Sector

Reassembly of the Upper End

1. Install the sector in the lock cylinder hole over the sector shaft with the tang end to the outside of the hole. Press the sector over the pin with a blunt tool. Figure 3G-50. Sector should turn freely when installed.

2. Insert rack-preload spring. Bow of spring out against rack. Spring is symetrical so there is no up or down.

3. Assemble bolt to cross-over arm of rack. Figure 3G-51.

4. Insert the rack and lock-bolt assembly (Figure 3G-46). Position rack tooth sector so that the block teeth match. Figure 3G-52.

5. Position lever return spring over tapped post. As shown in Figure 3G-53. Slip lever finger into rack slot and hole over tapped post. Make sure end of spring contacts lever as shown. Figure 3G-52.

6. Raise lever slightly. Slip end of spring between lever and boss, and then down to secure. Figure 3G-55.

7. Coat wave washer with chassis lube and place on tapped boss over release lever. Figure 3G-45.

8. Carefully position shroud onto housing (so as not to un-seat wave washer). Drive three screws (washer first) and tighten to 18 in. lbs. Figure 3G-44.

9. Place actuator rod into rack. (Short end of rod into rack).

10. Position housing and shroud assembly onto jacket and drive four screws (Figure 3G-43). Tighten to 60 in. lbs.

11. Assemble buzzer switch into spring clip with formed end of clip, around the lower end of the switch (Figure

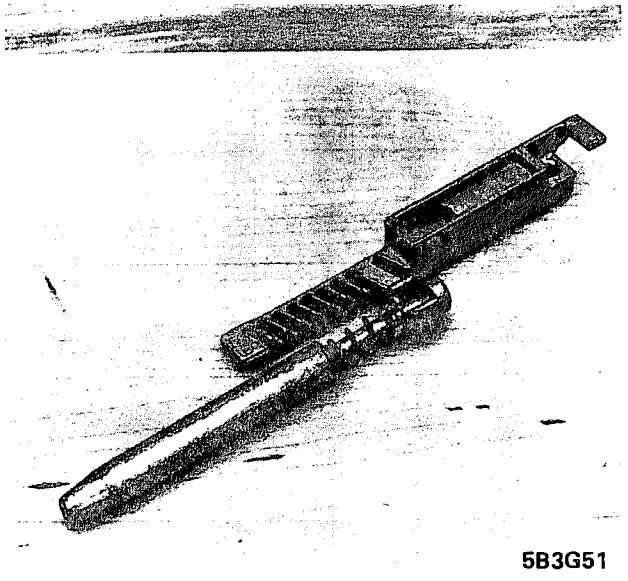


Figure 3G-51 - Bolt to Rack Assembly

Figure 3G-52 - Mate Block Tooth of Sector with Rack

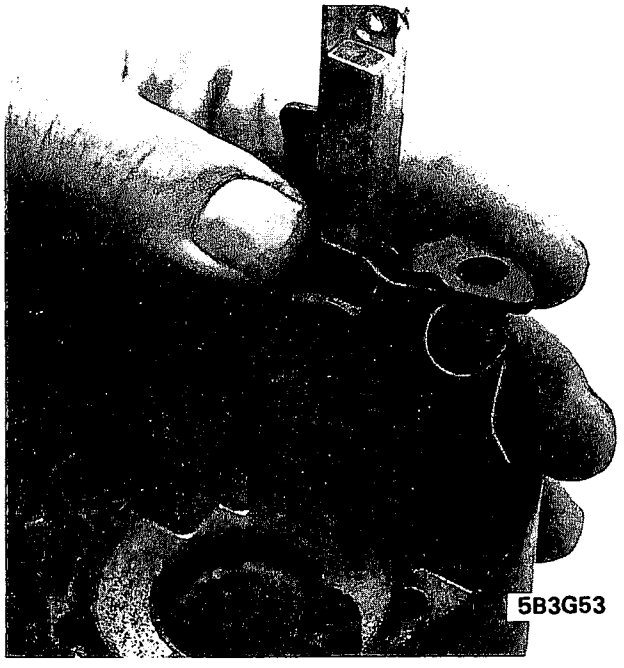


Figure 3G-53 - Spring and Lever Position

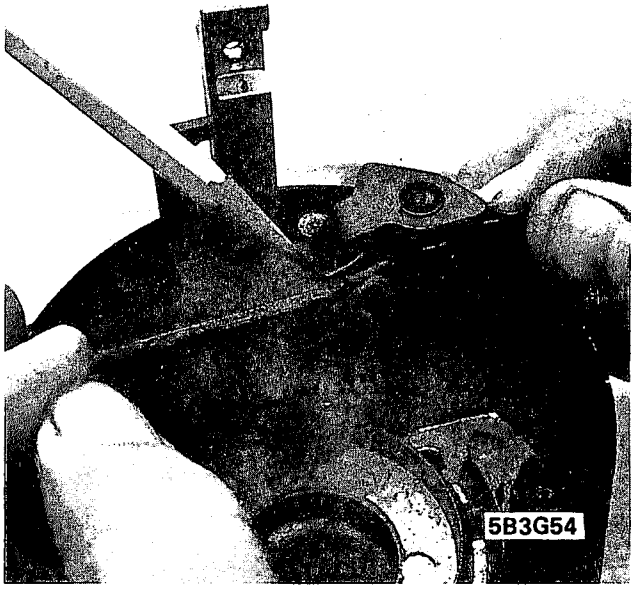


Figure 3G-54 - Spring Position

3G-56). Push switch and spring assembly into hole with internal switch contacts toward the lock cylinder bore.

12. Install lock cylinder. Hold cylinder sleeve in left hand and rotate knob (key in) clockwise to stop. This retracts actuator.

Insert cylinder into housing bore with key on cylinder sleeve aligned with key-way in housing. Push cylinder in until it bottoms. Rotate knob counterclockwise, maintaining a light pressure inward until drive section of cylinder mates with sector.

Push cylinder in fully until retainer pops into the housing groove. Cylinder cannot be removed by merely pulling on it.

13. Turn cylinder clockwise to stop and then counterclockwise to stop "off-unlock" position. Place ignition switch in the "off-unlock" position using the following procedure.

Move the slider to the extreme left. (Accessory).

Move the slider 2 positions to the right from "accessory" to the "off-unlock" position.

Fit the actuator rod into the slider hole and assemble to the column with two screws. Caution should be exercised to prevent moving the switch out of detent. Use only the correct screws. Tighten to 35 in. lbs.

14. If lower bearing and adapter assembly was removed, press in new. Align adapter projection with jacket slot. Press adapter into jacket until it bottoms.

15. Insert drive shaft up through lower and then upper bearing.

16. Replace turn signal switch. Bend wires against connector and then feed connector down through bowl and

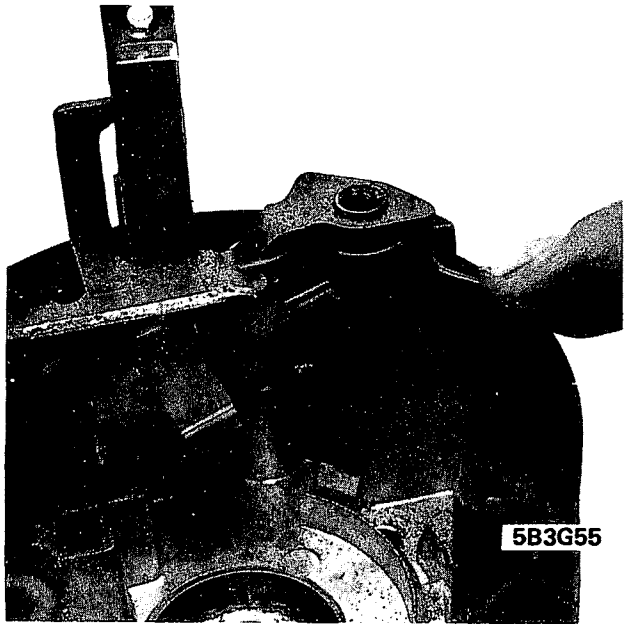


Figure 3G-55 - Securing Spring

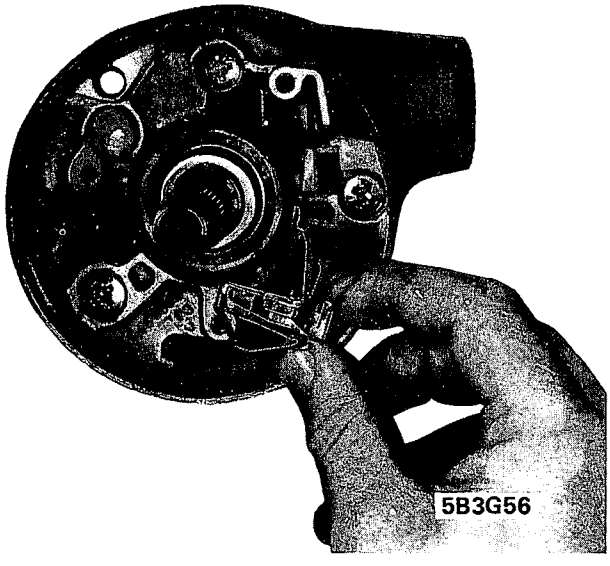


Figure 3G-56 - Position of Switch and Retainer

shroud assembly. Position switch into housing and drive three screws. Tighten to 35 in. lbs.

17. Assemble washer, spring, and cancelling cam on the steering shaft. The two lobes on cam to center between springs on switch (Figure 3G-57). The signal switch must be in "Neutral" position and the hazard warning plunger is "Out."

18. Assemble the shaft lock onto the shaft. Using Tool J-23653, depress the spring and snap a new retaining ring in groove on the shaft. Figure 3G-58.

19. Place cover on shaft lock and drive three screws. (15 in. lbs.).

20. Replace I.P. Mounting Bracket. Drive four screws and tighten to specifications.

21. Snap connector into bracket on jacket.

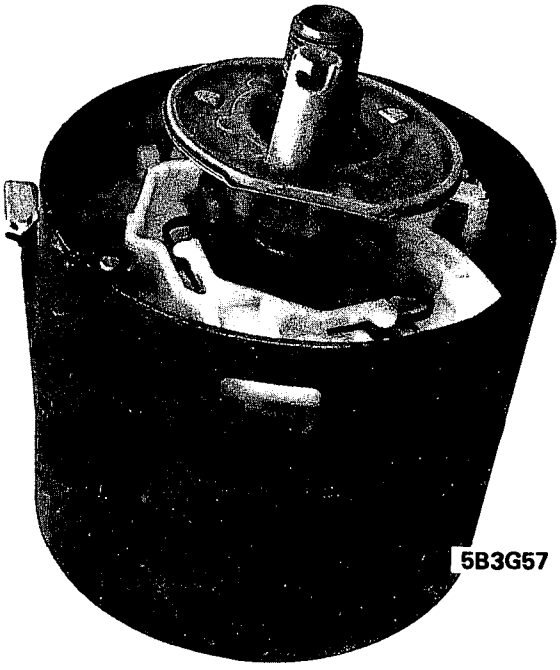


Figure 3G-57 - Cancelling Cam Lobe Position

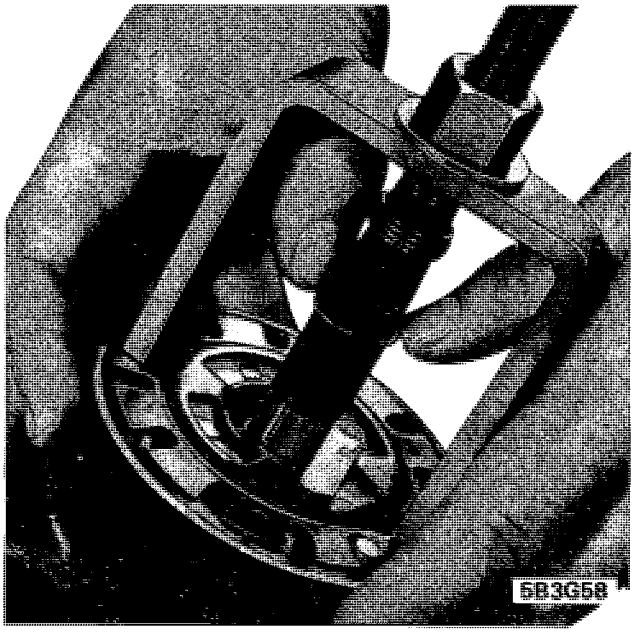


Figure 3G-58 - Install Retaining Ring

DISASSEMBLY AND ASSEMBLY OF KEY RELEASE TILT COLUMN

Disassembly

1. Remove column mounting bracket bolts and mounting bracket. Figure 3G-36.

2. Remove signal switch wire protector from mounting nuts. (Figure 3G-59) and then strip wires from protector. DO NOT DAMAGE WIRES. Unsnap connector from bracket tape wires close to connector to prevent snagging when removing switch.

3. Remove wheel nut retainer and wheel nut. Remove steering wheel using puller. DO NOT HAMMER ON END OF STEERING SHAFT.

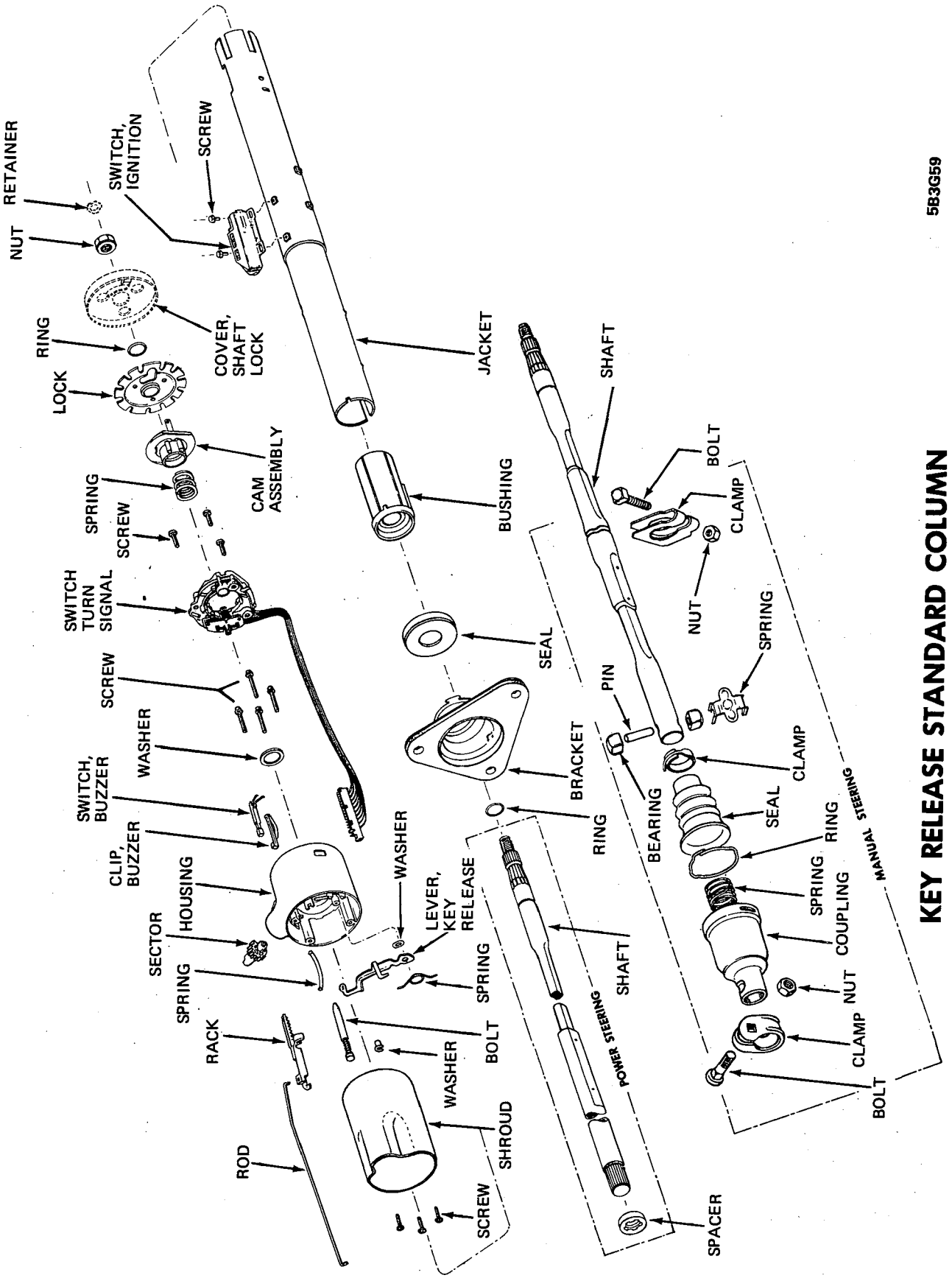


Figure 3G-59 - Key Release Standard Column

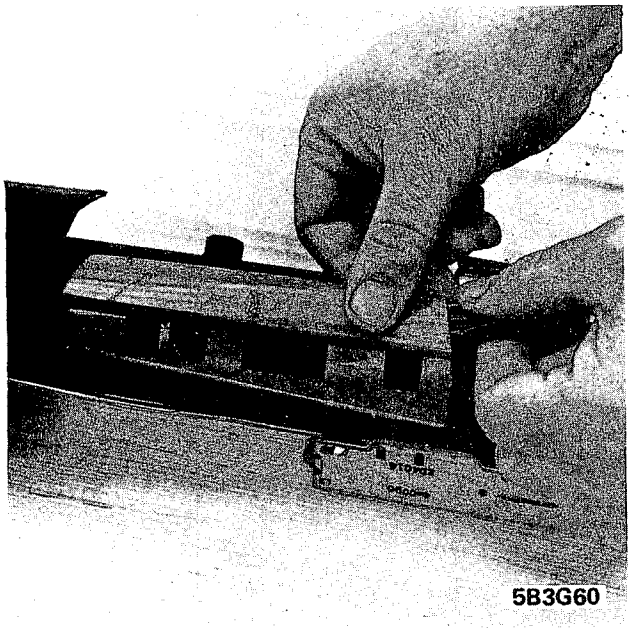


Figure 3G-60- Removal of Protector

4. Loosen the three cover screws and lift cover from housing.

5. Remove tilt release lever and signal switch lever. Deptree hazard warning knob. Remove knob.

6. Depress shaft lock down using special Tool J-2365 (Figure 3G-38). Do not remove all spring load as ring will tend to rotate. Pry retaining ring out of shaft groove. Remove shaft lock, cancelling cam & upper bearing spring.

7. Remove the 3 signal switch screws. Pull switch straight while guiding connector up thru shroud. Figure 3G-39.

8. To avoid damage to the buzzer switch, remove the lock cylinder in the "run" position.

Insert a thin tool into the slot next to the switch mounting boss and depress retainer at bottom of slot. At the same time, pull lock cylinder from housing. Figure 3G-40.

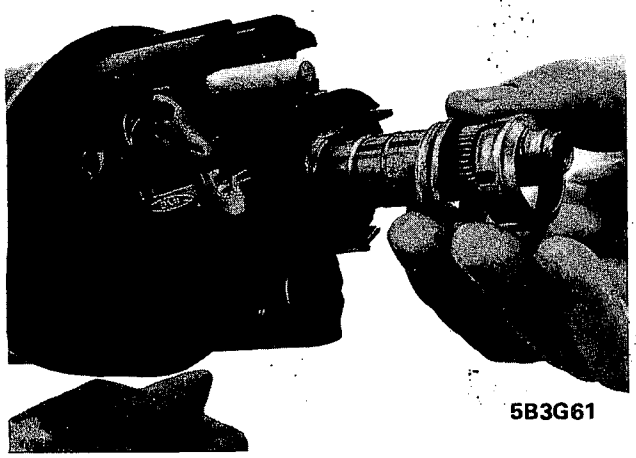


Figure 3G-61 - Race and Seat Removal

9. The buzzer switch can be pulled straight out of the housing. A "straightened" paper clip or similar piece of stiff wire with a hook bent on one end should be inserted in the exposed loop of the wedge spring, then a straight pull on the wire will remove both spring and switch. (If the lock cylinder is not removed before the switch, it must be in the "on" position). Figure 3G-41.

CAUTION: *If wedge spring is dropped on removal, it could fall into the column, requiring complete disassembly. To retrieve spring.*

10. Remove three cover screws and cover.

11. With cover removed, slip race and seat from end of shaft. Figure 3G-61.

12. Reinstall tilt release lever and place column in full tilt "up" position. Remove tilt spring retainer using screw

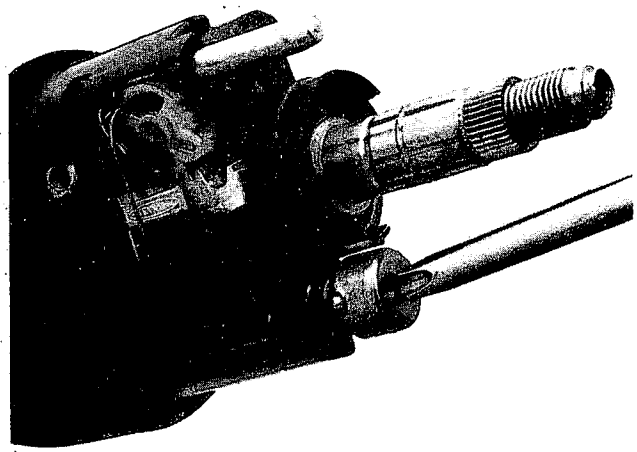


Figure 3G-62 - Remove Tilt Spring

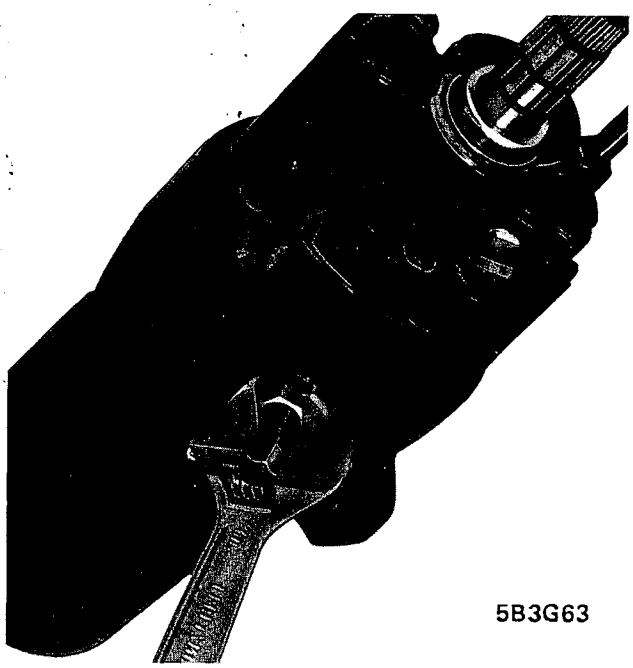


Figure 3G-63 - Removing Pivot Pins

driver blade that just fits into slot opening. Insert screw driver in slot, press in approximately 3/16 in., turn approximately 1/8 turn counterclockwise until ears align with grooves in housing and remove spring and guide. Figure 3G-62.

13. With ignition switch in the "off-unlock" position, remove the two mounting screws and then the switch. Figure 3G-42.

14. Remove both pivot pins using special Tool J-21854-1.

15. Disengage lock shoe by depressing the tilt housing upward to free shoes and then cock head to left to separate rack from actuator.

16. Remove steering shaft assembly. First slip spacer off of lower end (Figure 3G-64) of shaft, then remove shaft by pulling straight out. Figure 3G-65.

Figure 3G-64 Pull Spacer

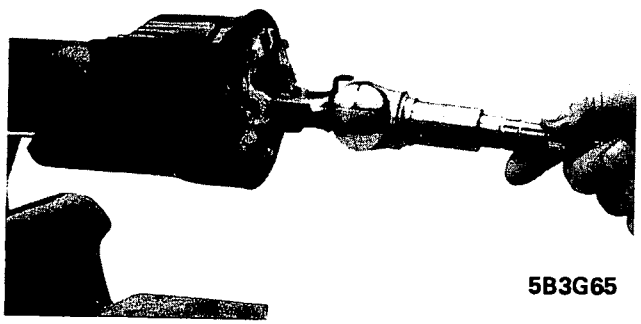


Figure 3G-65 - Remove Steering Shaft

17. Pull end of actuator rod from rack and remove from column.

18. Loosen and remove four support screws (Figure 3G-66). Pull on support to separate from jacket.

19. Remove lock plate. Tip top of plate back and rotate slightly counterclockwise to remove.

20. Unscrew the two shroud mounting screws (Figure 3G-67). Separate the shroud from the jacket with a twisting, pulling motion.

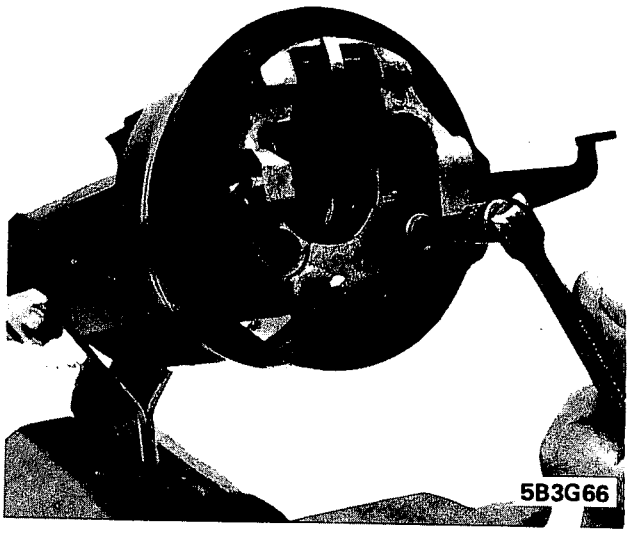


Figure 3G-66 - Remove Support Screws

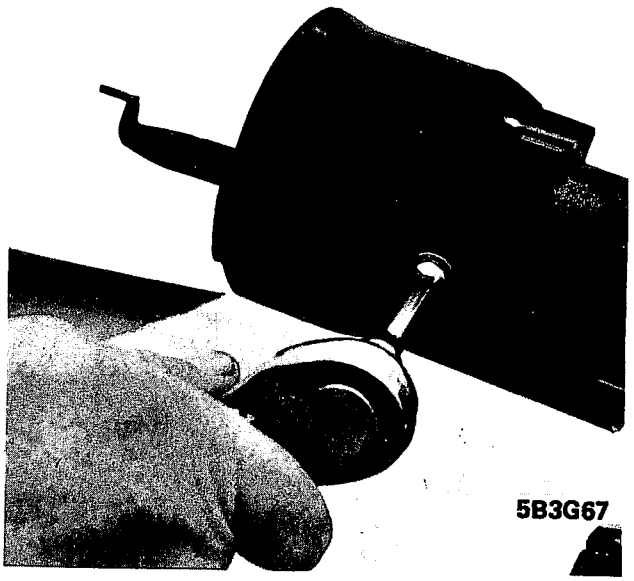


Figure 3G-67 - Removing Shroud

21. It is not necessary to remove the dash bracket or the bearing adapter unless part replacement is required. Should the bearing need replacement, slide the bracket off the jacket. Tap on the adapter around the full diameter with flat bladed punch and hammer (Figure 3G-49). It is not uncommon to destroy the adapter during removal.

If service is required on upper end only, steps 1 thru 21 may be performed in the car. It is necessary to remove the mounting bracket and loosen toe plate to prevent bending of jacket and toe plate to service the signal switch.

Bearing House Disassembly

22. Remove tilt lever opening shield from housing. Figure 3G-68.

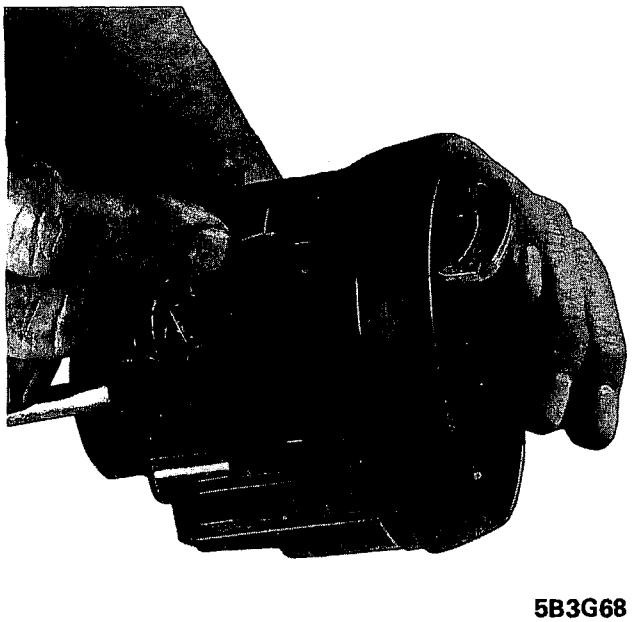


Figure 3G-68 - Remove Shield

23. Remove lock bolt spring by removing spring retaining screw and moving spring clockwise to remove from bolt. Figure 3G-69.

Figure 3G-69 - Remove Lock Bolt Spring

24. If there is a snap ring, remove it from sector drive shaft. With small punch lightly tap drive shaft from sector (Figure 3G-70). Remove drive shaft. Remove rack and rack spring (also shim, if there is one). Remove sector and bolt.

25. Remove tilt release lever pin with pin punch and hammer. Remove lever and release lever spring. (To relieve load on release lever, hold shoes inward and wedge block between top of shoes (over slots) and bearing housing). Figure 3G-70.

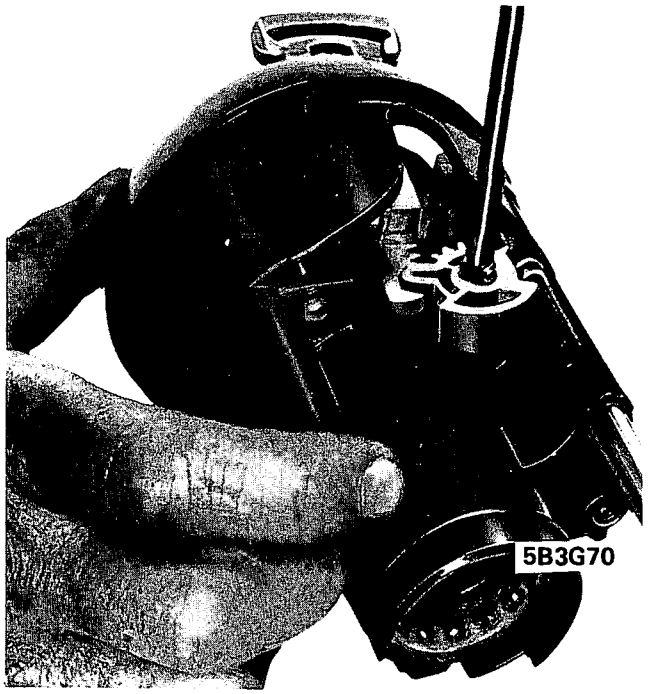


Figure 3G-70 - Remove Drive Shaft

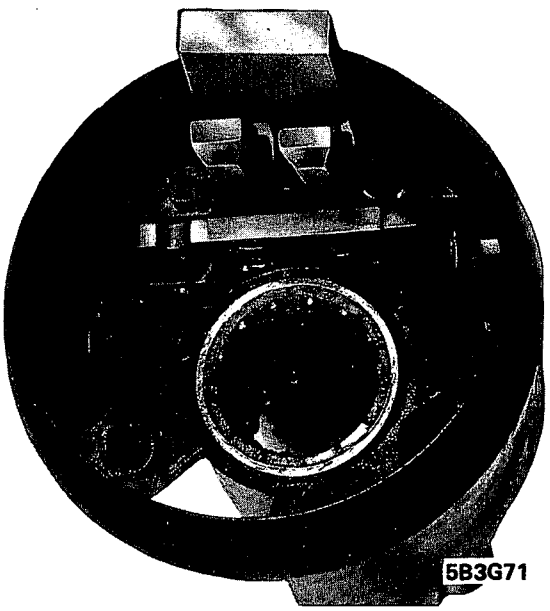


Figure 3G-71 - Remove Load on Release Lever

26. Remove lock shoe pin with punch andhammer. Remove lock shoes and lock shoe springs.

27. Remove bearings from bearing housing only if they are to be replaced. Remove separator and balls from bearing. Place housing on work surface. With a pointed punch against back surface of race, carefully drive race out of housing until bearing puller can be used. Repeat for other race. Do not re-use bearings.

Shroud Disassembly

28. Remove key release lever. Tip lever foward (to compress spring) and lift up. Spring is piloted on lever and may be removed for inspection. Figure 3G-72.

Assembly

Apply thin coat of lithium grease to all wear surfaces except lock, bolt and lock bolt hole.

Figure 3G-72 - Remove Key Release Lever

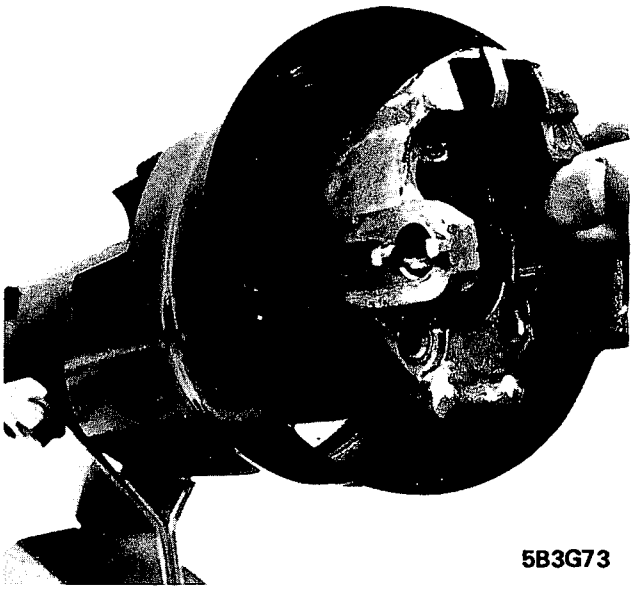


Figure 3G-73 - Install Support

Shroud Assembly

1. Position spring on key release lever into shroud slot. Compress spring by forcing with lever. Lever will slip into shroud slot. Figure 3G-72.

Bearing Housing Assembly

2. Install new bearings in bearing housing, if removed.

3. Install lock shoe springs, lock shoe and shoe pin in bearing housing. Use approximately .180 rod to line up shoes for pin installation.

4. Install spring, release lever and pin in bearing housing. (Again, relieve load on release lever as in disassembly procedure.)

5. Install drive shaft in housing. Lightly tap sector onto the shaft far enough to expose snap ring groove. Replace snap ring if it was removed.

6. Install lock bolt and engage with sector cam surface. Figure 3G-70.

7. Install rack and spring. (Replace shim if one was removed). Block tooth on rack to engage block tooth on sector (Figure 3G-69). Install external tilt release lever.

8. Install bolt spring and spring retaining screw. Tighten to 35 inch-pounds.

Column Assembly

9. Slide shroud onto bowl, align mounting holes. Drive 2 mounting screws (Figure 3G-67). Tighten to 30 in. lbs.

10. Install lock plate into place. Work lock plate into notches in jacket by tipping lock plate toward bowl hub at 12 o'clock position and under jacket opening. Slide lock plate into notches in jacket.

11. Line up "V" of support with notch in jacket (Figure 3G-73). Press support into jacket. Press key release lever down to fully seat support.

Start support screws in with fingers. With all started, tighten to 60 in. lbs.

12. Install ignition switch actuator rod through bowl from top and insert in slot in support.

13. Install steering shaft assembly. Murn slowly as inserting to clear inner seal (Figure 3G-65). Slide spacer on bottom of shaft. Figure 3G-64.

14. Holding lock shoes in disengaged position, assemble bearing housing over steering shaft until the pivot pin holes line up with the holes in the support.

15. Install pivot pins – assemble as far as possible using palm pressure of hand to prevent broaching of support pivot hole. Once started, tap in with a small hammer and push.

16. Place housing in full "up" position, install guide, make sure there is grease between the guide and peg on support, tilt spring and tilt spring retainer, using screw driver in

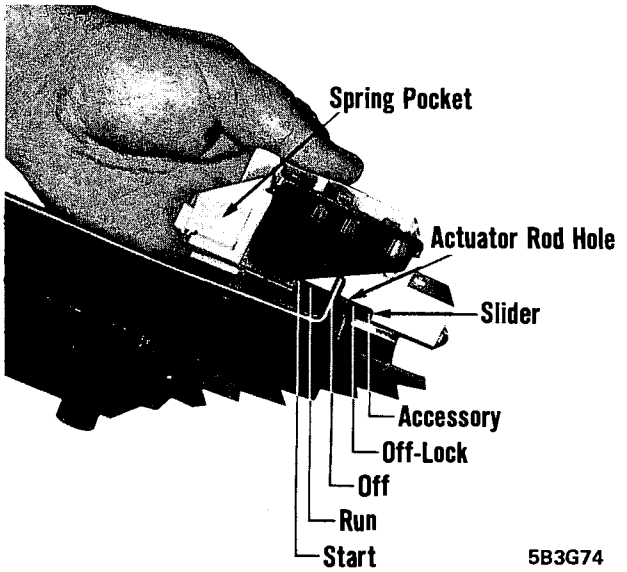


Figure 3G-74 - Installing Ignition Switch

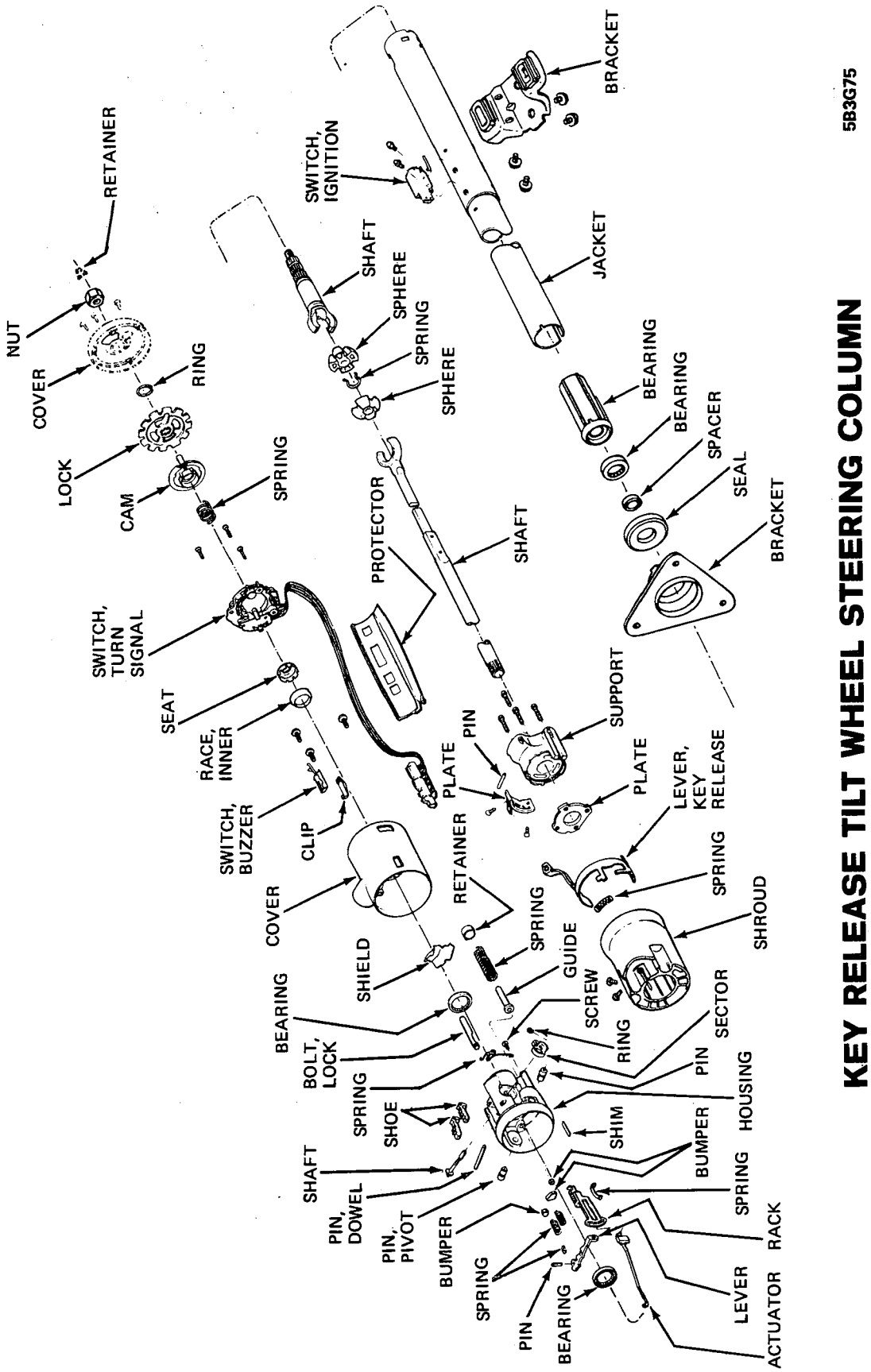


Figure 3G-75 - Key Release Tilt Column

retainer slot. Turn retainer clockwise to engage. Figure 3G-62.

17. Install tilt lever opening shield in housing. Figure 3G-68.

18. Remove tilt release lever, install housing cover and seat screw at 12 o'clock position first. Tighten to 100 inch-pounds, 3 screws.

19. Assemble buzzer switch to spring clip with formed end of clip under end of switch and spring bowed away from switch on side opposite contact (Figure 3G-56). Push switch and spring into hole in cover to the step with the contacts toward lock cylinder bore.

20. Install signal switch wires and connector through cover, bearing housing and bowl. Push hazard warning knob in, install switch and tighten screws to 35 inch-pounds.

21. Install hazard warning knob andpull knob out. Install bearing inner race, seat, bearing preload spring, cancelling cam and shaft lock.

22. Depress lock plate and install new retaining ring using Tool J-23653. Figure 3G-58.

23. Reinstall tilt release lever, signal switch lever (15 inch-pounds) and hazard warning knob (5 inch-pounds). Install upper shift lever and drive in pivot pin.

24. To install lock, hold lock cylinder sleeve and rotate knob clockwise aginst stop. Insert cylinder into cover bore with key on cylinder sleeve aligned to keyway in housing. Push in to abutment of cylinder and sector. Rotate knob counterclockwise, maintaining a light push inward in cylinder, until drive section of cylinder mates with drive shaft. Push in until retainer pops into groove. This locks cylinder into housing. Check freedom of rotation.

25. Install shaft lock cover and tighten three screws to 15 inch-pounds.

26. When replacing ignition switch, place the lock in off-unlock position. Place the switch in off-unlock by the following procedure.

27. Position the switch as it is shown in Figure 3G-74.

28. Move the slider to the extreme right, to the "acc" position and then back two clicks to off-unlock-actuator rod hole will nearly be in center of slot.

Fit the actuator rod into the slider hole and assemble to the column with two screws. Lightly push the switch down the column (away from the steering wheel), to take out lash in the actuator rod, and tighten mounting screws. Caution should be exercised to prevent moving the switch out of detent. Use only the correct screws. Tighten to 35 inch-pounds.

29. Snap connector into bracket. Remove holder tool & install lower wire protector over wires and on jacket. Figure 3G-59.

30. Install mounting bracket. DO NOT SUBSTITUTE BOLTS. (Mounting bracket torque, 15 foot-pounds).

31. Install steering wheel. Torque steering wheel nut to 30 foot-pounds.

32. Install horn parts.

DISASSEMBLY AND ASSEMBLY OF FUNCTION LOCKING STANDARD STEERING COLUMN

All elements of energy absorbing columns are sensitive to damage and must be handled with care.

Disassembly - Upper End Only (Column Out Of Car)

If service is required on the upper end only, steps 1 through 13 can be performed in the car. If equipped with air cushion restraint, follow the driver module and steering wheel removal and installation procedure covered in

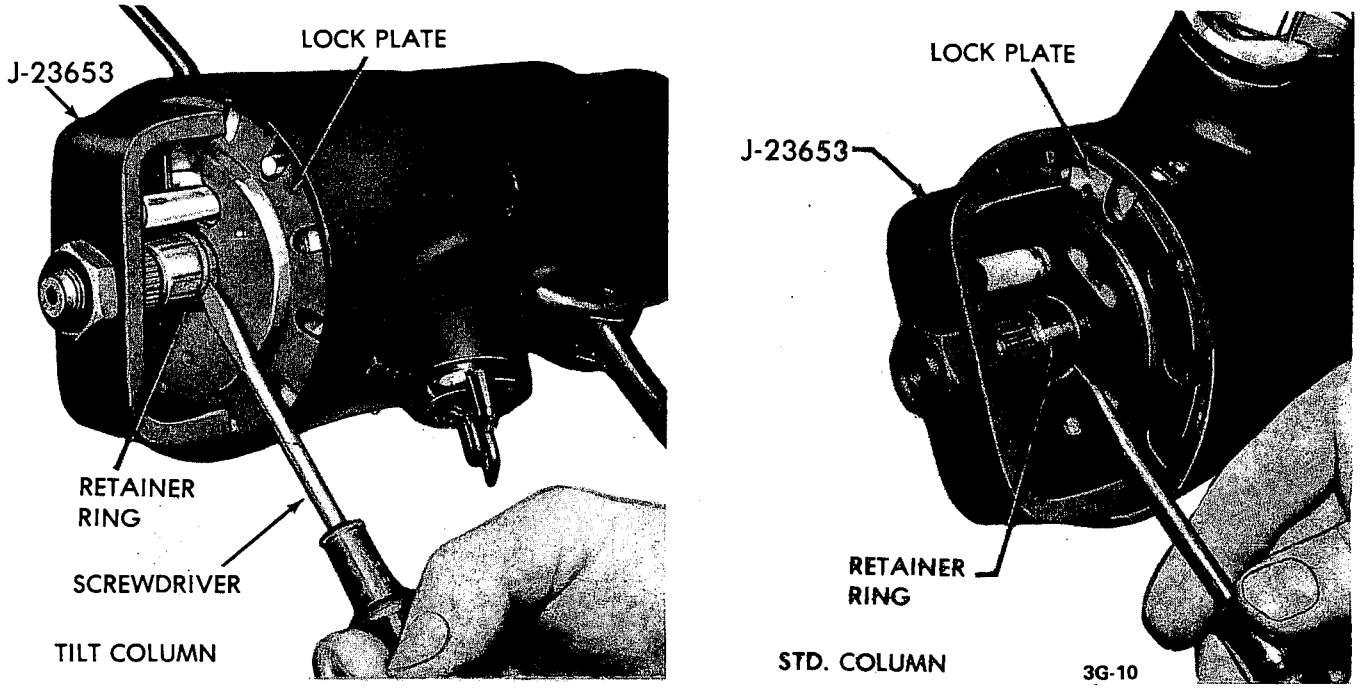


Figure 3G-76 Removing Lock Plate Retainer Ring

this section. MAKE SURE COLUMN IS NOT BENT DURING REMOVAL FROM CAR.

1. Remove steering wheel using specified wheel puller. Do not hammer end of steering shaft.

2. Remove the three cover screws and remove cover. Remove cardboard screw retainers.

3. Depress lock plate using tool J-23653 and the steering wheel nut. Pry the round wire snap ring out of the shaft groove and discard ring. Remove the snap ring and shaft lock plate. See Figure 3G-76. With ring removed, shaft could slide out bottom of column causing damage to shaft if column is out of the car.

4. Slide upper bearing preload spring and horn contact turn signal cancelling cam off upper steering shaft.

5. Slide thrust washer off upper steering shaft.

6. Remove turn signal lever screw and lever.

7. Push hazard warning switch in and remove screw and knob.

8. Remove three turn signal switch mounting screws and lower I.P. trim. (If only the lock and/or buzzer is to be removed, unplug signal wiring. There is enough extra wire to pull switch up and out of the way without dropping column. Figure 3G-78). Remove four mounting bracket screws and the bracket from the jacket. Pull the connector out of the bracket on the jacket. Wrap a piece of tape around the upper part of the connector and wires to prevent snagging when removing switch. Also remove the wire protector. See Figure 3G-77.

9. Pull the switch straight up with wire protector. See Figure 3G-78.

10. The lock cylinder should be removed in the "run" position.

11. Insert a thin tool (small screw driver or knife blade) into the slot next to the switch mounting screw boss (right hand slot). The slot may have flashing over it that will

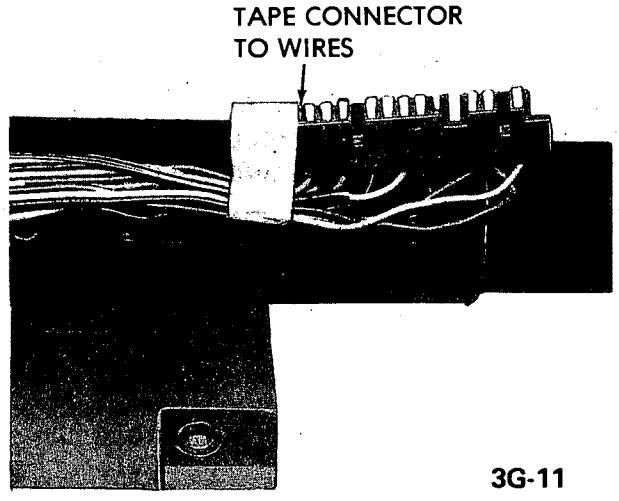


Figure 3G-77 Tape Connector to Wires

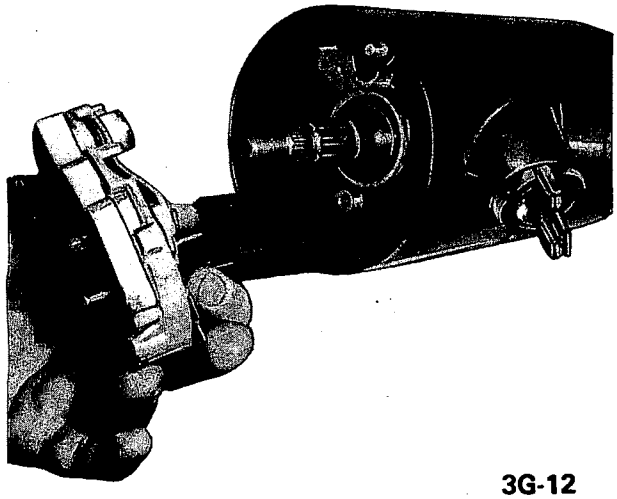


Figure 3G-78 Removing Turn Signal Switch and Wires

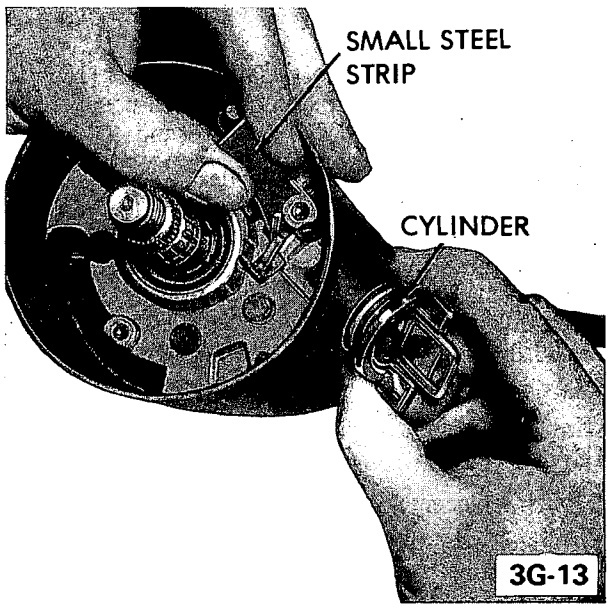


Figure 3G-79 Removing Ignition Lock Cylinder

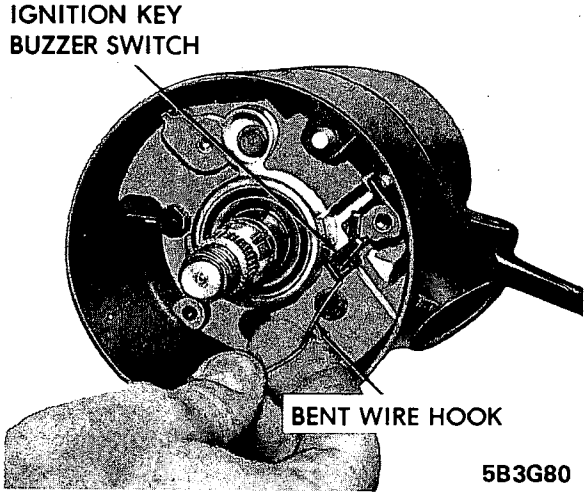


Figure 3G-80 Removing Buzzer Switch

have to be removed. Depress spring latch at bottom of slot, which releases lock. Remove lock. See Figure 3G-79.

12. The buzzer switch can be pulled straight out of the housing. (This may be done without removing the lock cylinder. However, the lock cylinder must be in the "run" position.) See Figure 3G-80. Do not pull on switch terminals. Use a bent wire or needle nose pliers to pull on switch clip. Make sure buzzer clip comes out with the switch. If it falls into the column, further disassembly will be required to retrieve it.

To remove any additional parts from the upper end, the ignition switch should be removed.

13. The ignition switch should be positioned in "OFF-UNLOCKED" position before removing. If the lock cylinder has already been removed, the connecting rod to the switch should be pulled up until there is a definite stop, then move down two detents which is the "OFF-UNLOCKED" position. Now remove the two attaching screws and the switch.

14. Drive out upper shift lever pivot pin and remove upper shift lever.

15. Remove the four screws attaching the upper housing to the jacket. Remove the upper housing assembly.

16. Remove thrust cup. See Figure 3G-81.

17. Remove the rack and lock bolt. See Figure 3G-82.

18. Remove the rack preload spring. See Figure 3G-83.

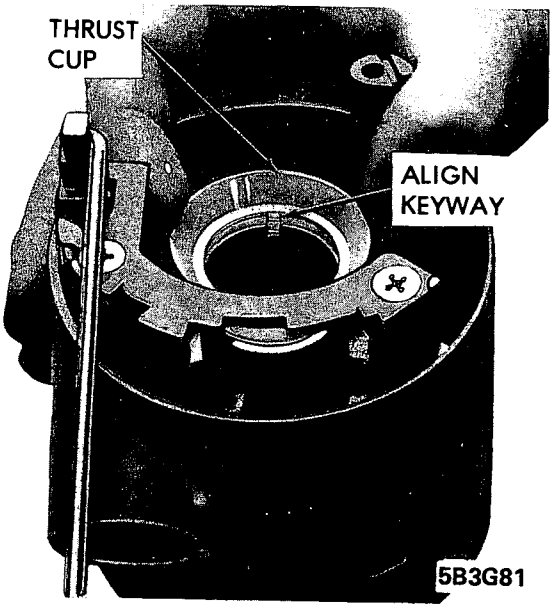


Figure 3G-81 Thrust Cup

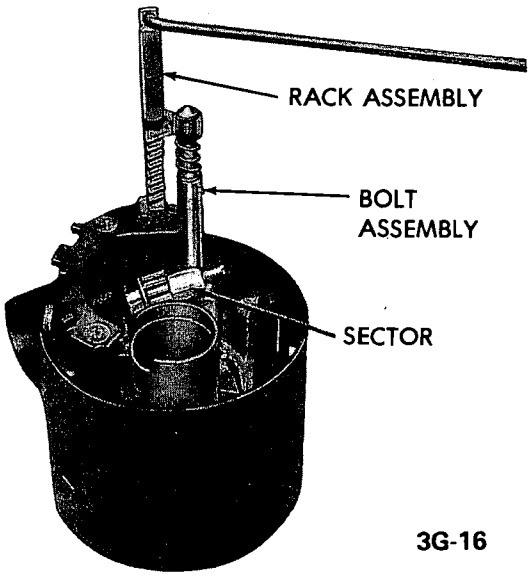
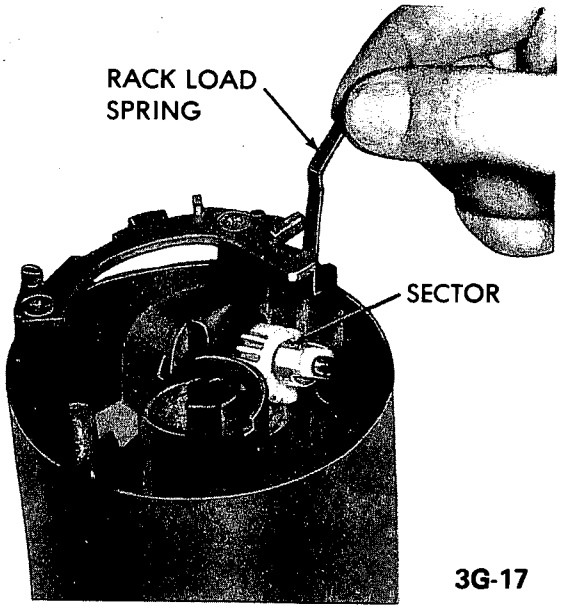


Figure 3G-82 Rack and Lock Bolt



19. Remove the shift gate. See Figure 3G-84.

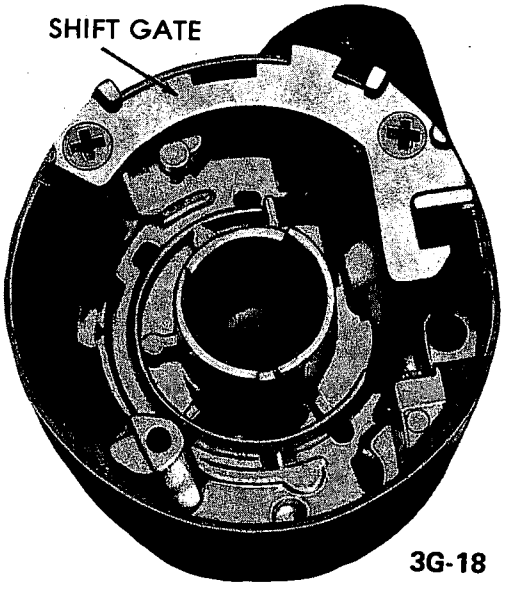


Figure 3G-84 Removing Shift Gate

20. Remove the sector through the lock cylinder hole by pushing firmly on the block tooth of the sector with a blunt punch. See Figure 3G-85.

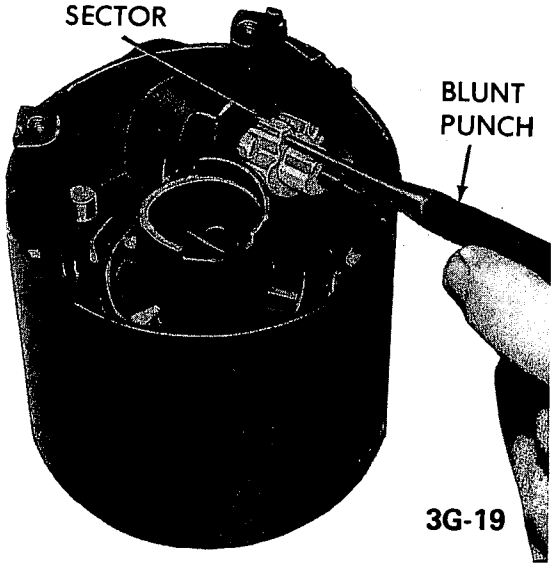


Figure 3G-85 Removing Sector

21. Remove shift bowl and shroud from the jacket.

22. Remove lower bowl bearing from top of jacket. Figure 3G-86.

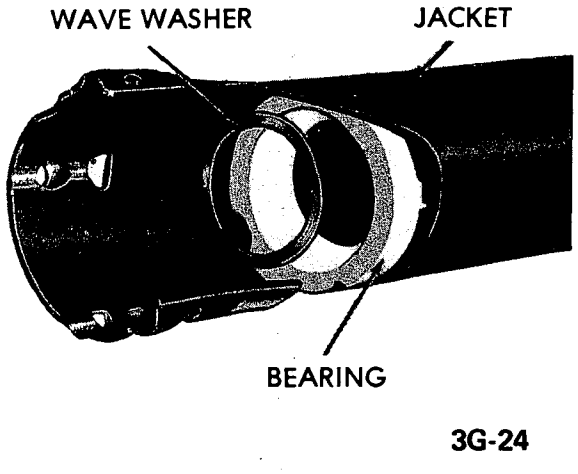


Figure 3G-86 Removing Lower Bowl Bearing

Disassembly of Lower End (Column out of Car)

Steering wheel, cover, shaft lock, "C" ring, spring, cancelling cam and flat washer must be removed prior to disassembly of the lower end. Follow instructions above.

1. Pull steering shaft assembly from bottom of column.

2. (Automatic Transmission) Remove the two screws holding the neutral-start switch and remove switch. See Figure 3G-87.

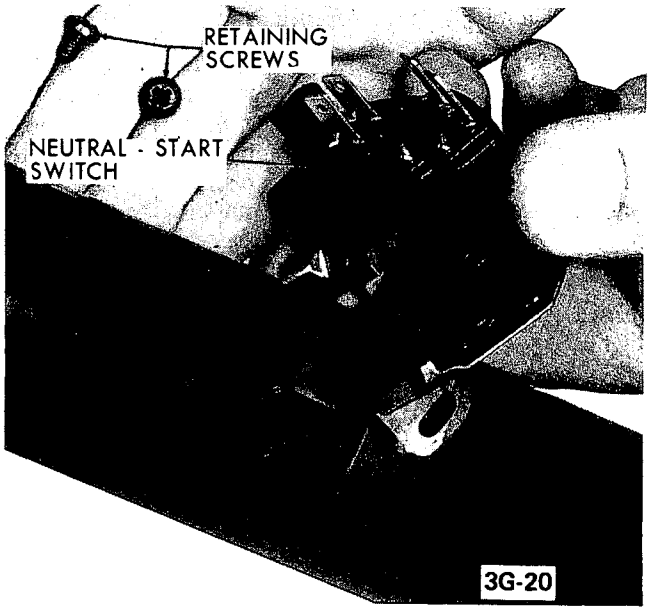


Figure 3G-87 Removing or Installing Switch

(Manual Transmission) Remove the two screws holding the back-up switch and remove switch.

3. Remove bearing adapter clip. See Figure 3G-88.

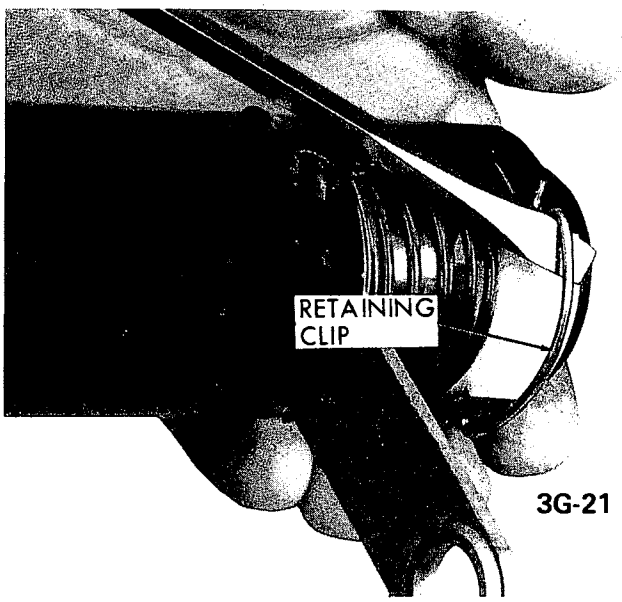


Figure 3G-88 Removing Bearing Adapter Clip

4. (Automatic Transmission) Remove bearing adapter retainer, bearing and adapter assembly and shift tube spring. (Bearing may be removed from adapter by a light pressout operation on the outer race of the bearing. See Figure 3G-89.

(Manual Transmission) Remove bearing and adapter assembly and first/reverse lever. (Bearing may be removed from adapter by a light pressout operation on the outer race.)

5. (Manual Transmission Only) Remove three screws from bearing at lower end. See Figure 3G-90.

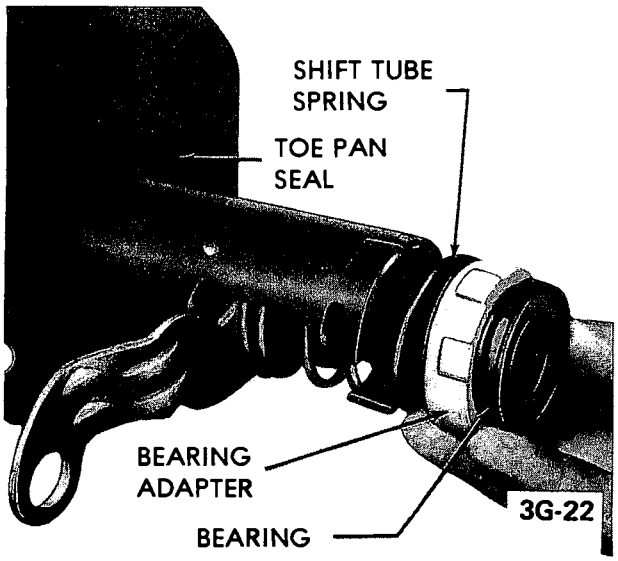


Figure 3G-89 Removing Lower Steering Column Bearing

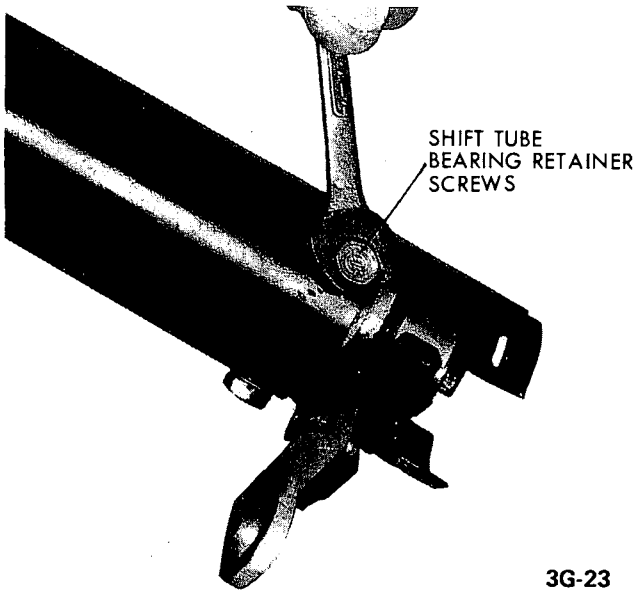


Figure 3G-90 Manual Transmission Bearing Screws

6. Slide out shift tube assembly.

Reassembly of Upper End

CAUTION: *Fasteners in the following steps are important attaching parts in that they could affect the performance of vital components and systems, and/or could result in major repair expense. It must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part or lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.*

Apply a thin coat of Lithium Soap Grease to all friction surfaces.

Only the specified screws should be used during assembly operations.

1. Install the sector in the lock cylinder hole over the sector shaft with the tang end to the outside of the hole. Press the sector over the pin with a blunt tool. See Figure 3G-91.

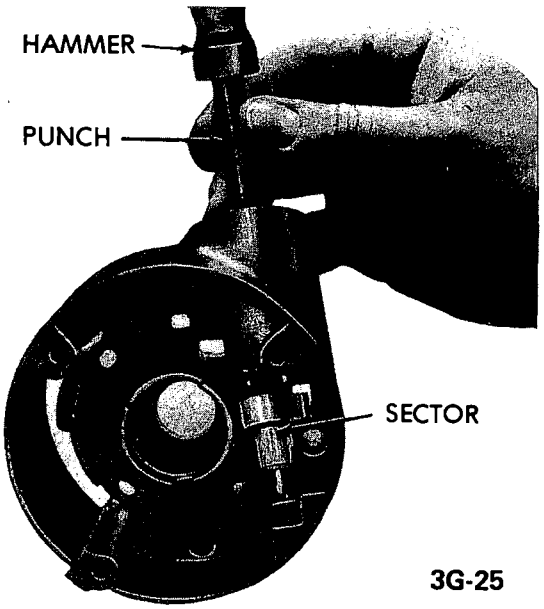


Figure 3G-91 - Installing Sector

2. Install the shift gate to the housing torque to specifications.

3. Insert the rack preload spring in the housing from the bottom side. The long section should be toward the steering wheel and hook on the edge of the housing. See Figure 3G-83.

4. Assemble the bolt to the cross-over arm of the rack. See Figure 3G-92.

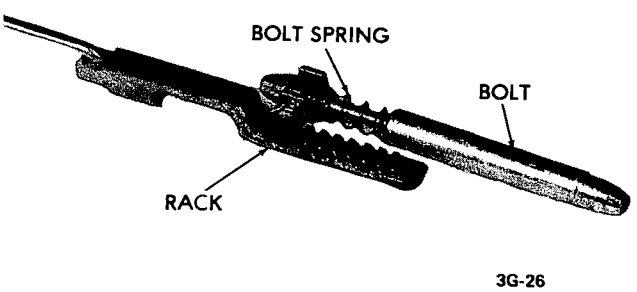


Figure 3G-92 - Assembling Bolt to Rack Cross-Over Arm

5. Insert the rack and lock bolt into the housing from the bottom with the teeth up (toward steering wheel) and toward the centerline of the column. See Figure 3G-93.

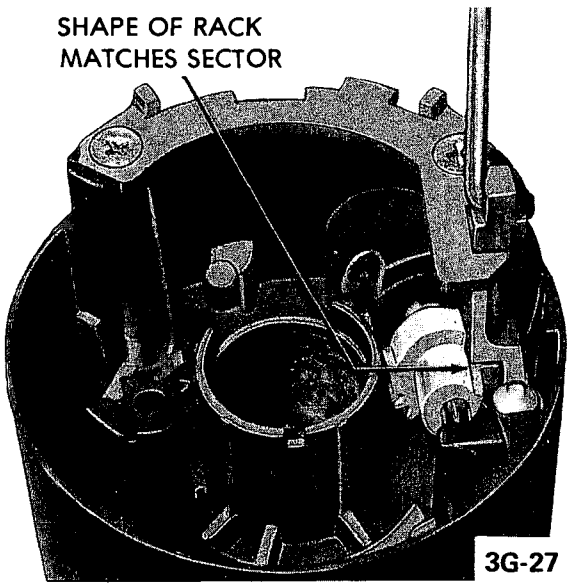


Figure 3G-93 - Rack and Lock Bolt Assembled to Sector

6. Install the thrust cup on the bottom hub of the housing. Be sure key of cup aligns with keyway in hub. See Figure 3G-81.

7. Install lower bowl bearing in jacket. See Figure 3G-86.

8. Install bowl and rotate it to be sure it is seated in bearing. See Figure 3G-94. Shift lever must not be installed before installing bowl.

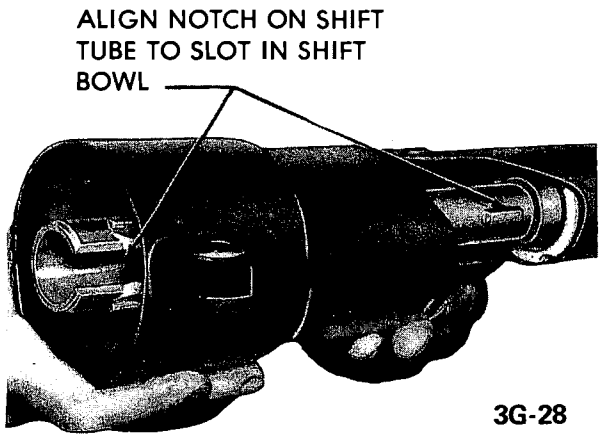


Figure 3G-94 - Installing Shift Bowl

9. With the bowl in place, install the upper bearing housing assembly on the jacket. The bowl should be in the "Park" position and the rack pulled downward. Be sure the housing is seated on the jacket and install the screws. See Figure 3G-95.

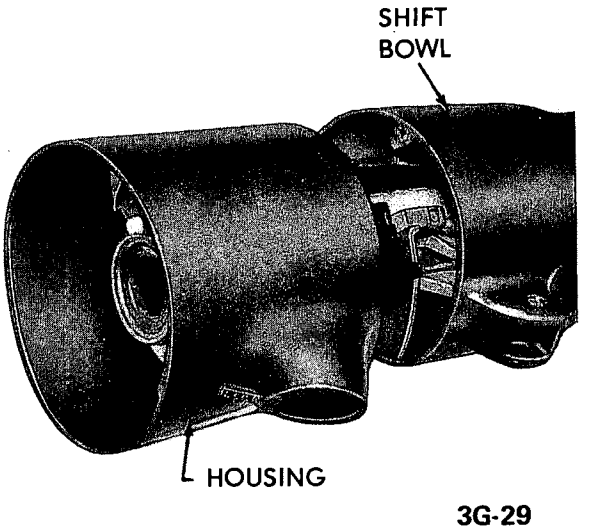


Figure 3G-95 - Installing Upper Bearing Housing

10. Assemble buzzer switch to spring clip with formed end of clip around the lower end of switch and spring bowed away from switch. This should lay on the switch opposite the contacts. Push switch and spring into hole with contacts toward the cylinder bore. See Figure 3G-96.

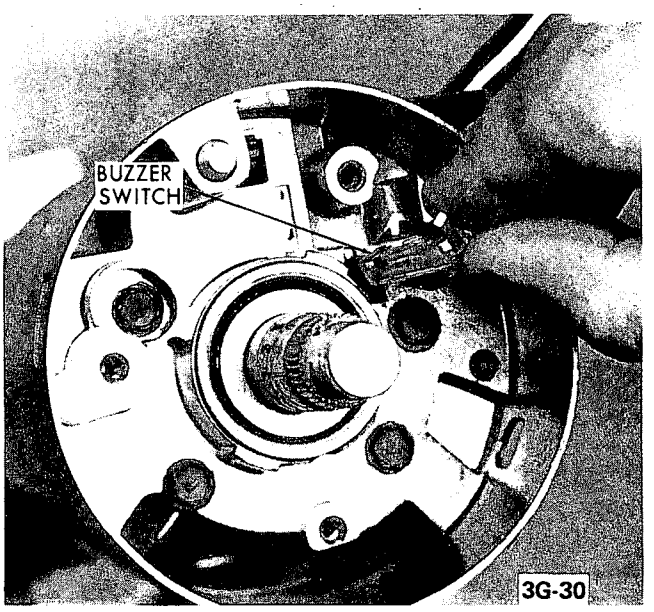


Figure 3G-96 - Installing Buzzer Switch Spring and Switch

11. To replace the turn signal switch. Feed the connector down through the housing. Assemble wires into protector and tape protector to column.

12. Drive the four mounting screws. Clip the connector to the bracket on the jacket. Reinstall all lower I. P. items. See Figure 3G-97.

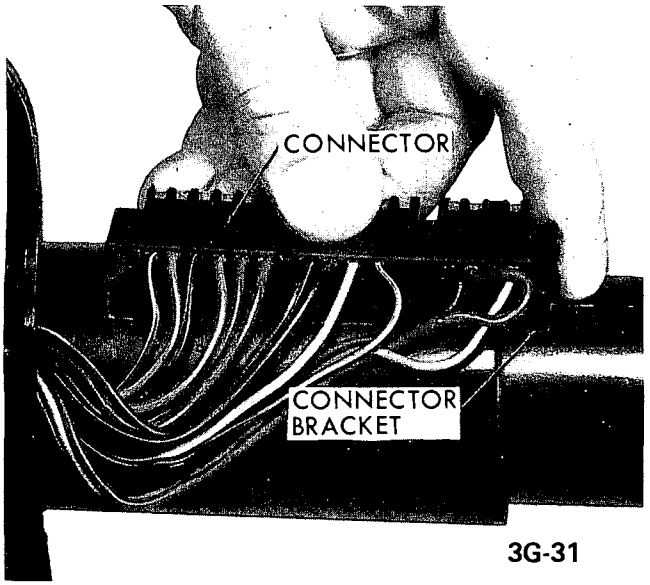


Figure 3G-97 - Installing Connector in Column Bracket

13. To install lock, hold lock cylinder sleeve and rotate knob clockwise against stop. Insert cylinder into housing bore with key on cylinder sleeve aligned to keyway in housing, push in to abutment of cylinder and sector. Rotate knob counterclockwise, maintaing a light push inward on cylinder, until drive section of cylinder mates with sector. Push in until snap ring pops into grooves and lock cylinder is secured in housing. Check freedom of rotation.

14. When installing the ignition switch, be sure the shift bowl is in any position except "Park" and rotate lock counterclockwise until the rack bottoms against the lower surface of the cast in bowl plate. Place the ignition switch in the "OFF-UNLOCK" position by moving the slide to "ACCESSORY" (extreme left) Figure 3G-98. Move two positions to "OFF-UNLOCK" right. Fit the actuator rod into the slider hole and assemble to column. Do not move switch out of detent. Tighten screws to 35 in-lbs.

15. Install the washer, spring and horn contact - cancelling cam on shaft, making certain that the turn signal switch is in "Neutral" and the hazard warning plunger is out. Install the shaft lock plate on the shaft. See Figure 3G-99.

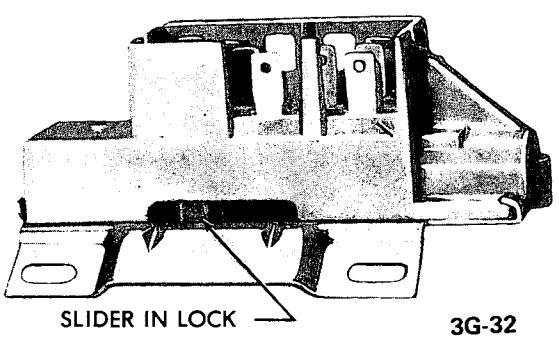


Figure 3G-98 - Ignition Switch Slider in "Lock" Position

The turn signal switch assembly may be damaged if the above procedure is not followed.

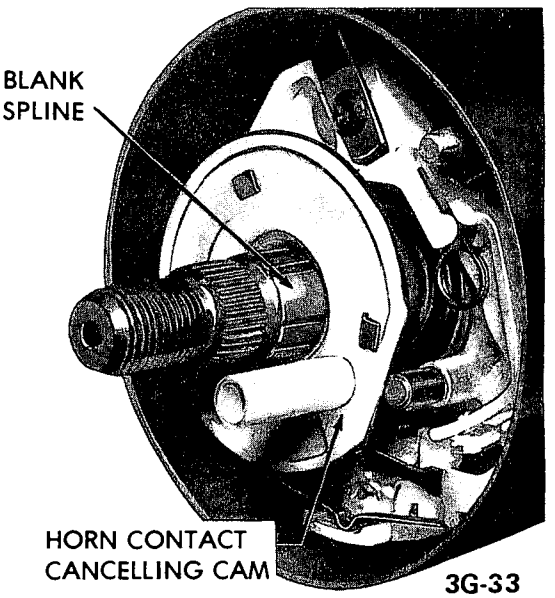


Figure 3G-99 - Horn Contact - Cancelling Cam Installed

16. Depress shaft lock plate using Tool J-23653 and install a new snap ring in groove on shaft.

17. Place cover on shaft lock and install screws to 15 in-lbs.

18. Install steering wheel and levers. Be sure to use tongue depressor on bowl spring. Be sure bowl is in "Drive" when inserting shift lever.

19. Install steering wheel and levers.

Reassembly of Lower End

CAUTION: *Fasteners in the following steps are important attaching parts in that they could affect the performance of vital components and systems, and/or could result in major repair expense. It must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part or lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.*

Apply a thin coat of Lithium Soap Grease to all friction surfaces.

Only the specified screws should be used during assembly operations.

1. Press the lower bearing assembly into adapter assembly.

2. Insert the shift tube assembly into the lower end of the jacket and rotate until the upper shift tube key slides into the bowl keyway.

3. (Manual Transmission Only) Loosely attach three screws in jacket and shift tube bearing. See Figure 3G-90.

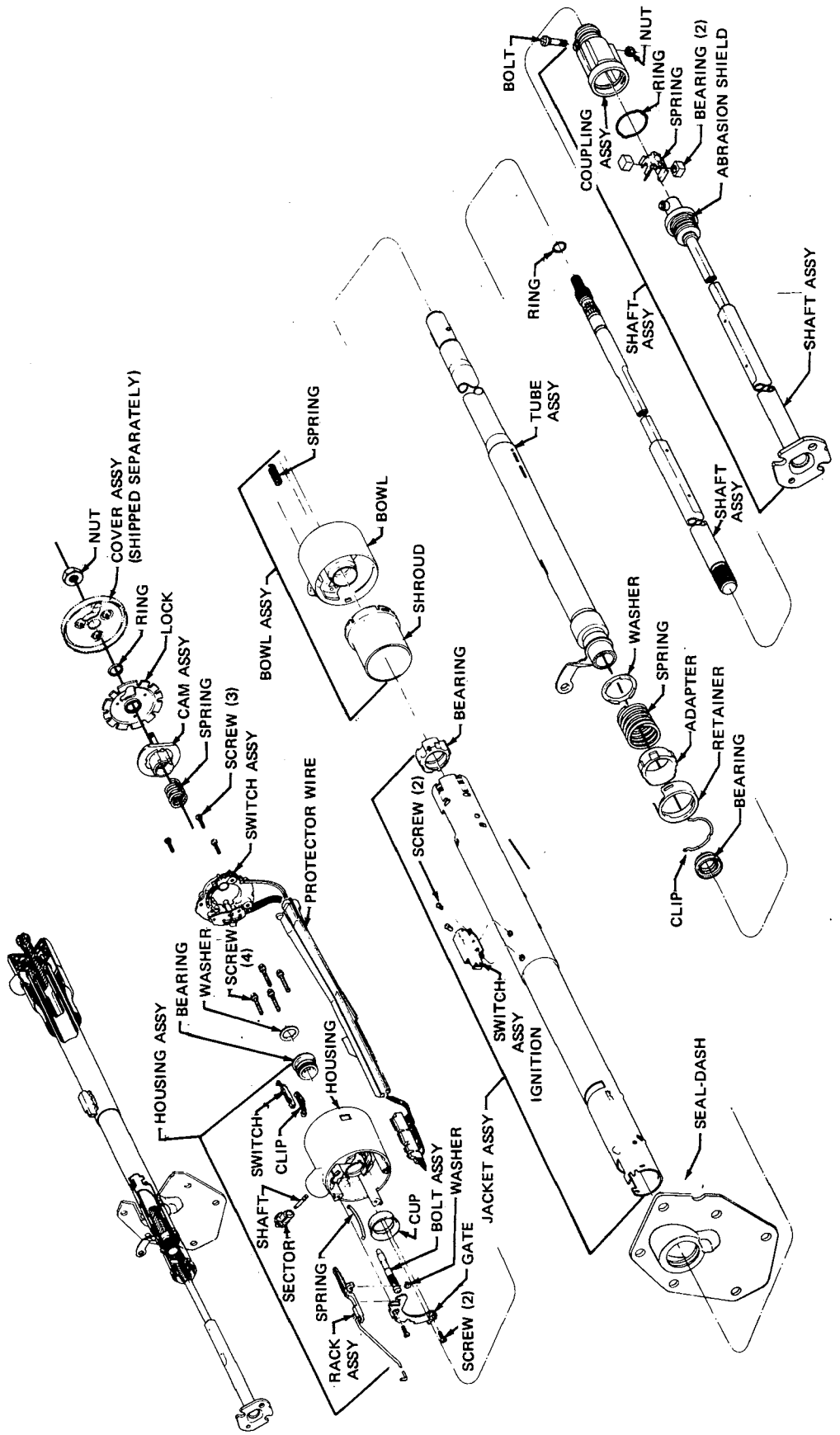


Figure 3G-102 Function Locking Standard Steering Column

4. (Automatic Transmission) Assemble the spring adapter assembly into the bottom of the jacket. Holding the adapter in place, insert the snap ring in the jacket slots.

(Manual Transmission) Assemble the first/reverse lever and adapter assembly into the bottom of the jacket. Holding the adapter in place, insert the snap ring in the jacket slots. See Figure 3G-100.

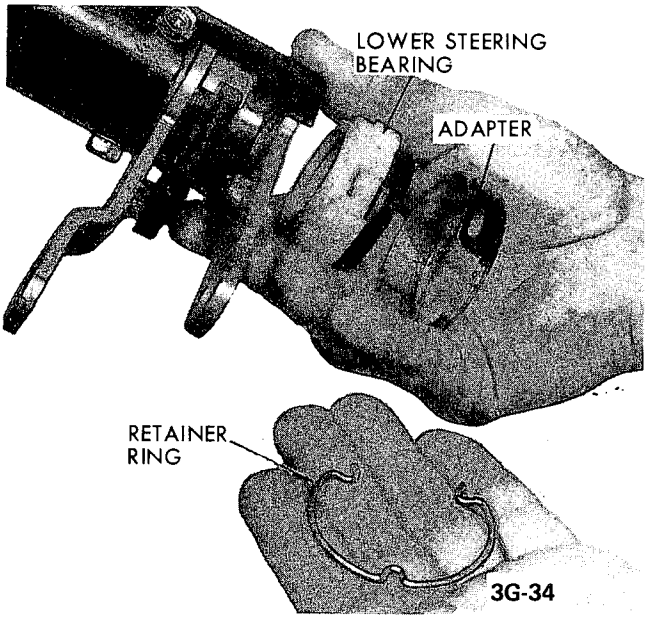


Figure 3G-100 - Installing Lower Column Bearing - Manual Transmission

5. (Manual Transmission Only) Place a .005 shim between first/reverse lever and lever spacer and turn upper shift bearing down and tighten the three screws. Remove shim. See Figure 3G-101.

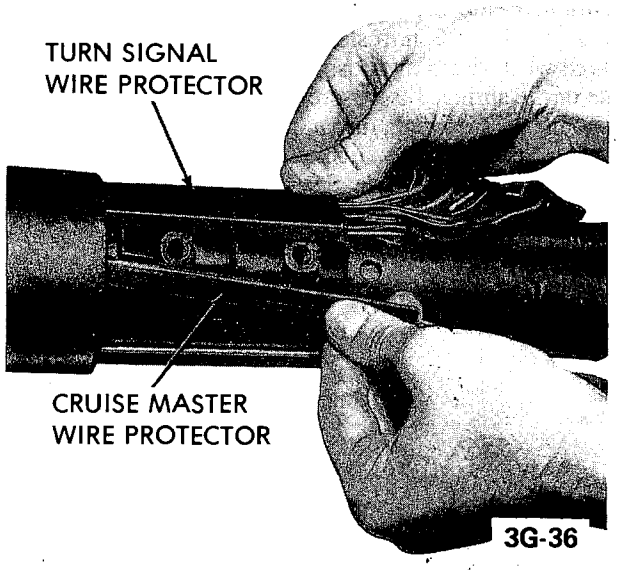


Figure 3G-101 - Adjusting Shift Tube Bearing Manual Transmission

6. (Automatic Transmission) Install the neutral-start switch, making certain the proper screws are used torque to 15 in-lbs. See Figure 3G-87.

(Manual Transmission) Install back-up switch, make certain only the proper screws are used.

7. Slide steering shaft assembly into column.

The upper housing should be in place before the shaft is assembled.

8. Depress shaft lock plate using Tool J-23653 and install a new snap ring in groove on shaft.

The turn signal switch assembly may be damaged if the above procedure is not followed.

9. Place cover on shaft lock and install screws.

10. Install steering wheel and levers. Be sure to use tongue depressor on bowl spring. Be sure bowl is in "Drive" when inserting shift lever.

11. Adjust neutral-start back-up light switch with shift lever in "Drive" position.

DISASSEMBLY AND ASSEMBLY OF FUNCTION LOCKING TILT STEERING COLUMN

All elements of energy absorbing columns are sensitive to damage and MUST BE HANDLED WITH CARE.

Disassembly (Column Out of Car)

If service is required on the upper end only, steps 1 thru 24 may be performed in the car. It will be necessary however, to lower steering column from instrument panel so that bracket can be removed to allow removal of turn signal switch and wires.

1. Remove column mounting bracket from column and SET ASIDE TO PROTECT BREAKAWAY CAPSULES.

2. Mount assembly in vise by clamping weld nuts on column in vise.

3. Remove steering wheel, retaining nut, snap ring retainer and wheel. Use specified wheel puller. Do not hammer on end of steering shaft.

4. Remove lower I. P. cover and column to dash support.

If only the buzzer and or lock are to be removed, the column brackets need not be removed or the column lowered. Unplug turn signal wiring and switch can be pulled up far enough to gain access to buzzer and lock.

5. Remove signal switch wire protector. Wrap tape around upper connector and wires to prevent swagging during removal. See Figure 3G-103.

5. Remove three cover screws and remove cover.

6. Remove tilt release lever, turn signal switch lever, push hazard warning plunger in and remove hazard warning knob. Remove upper shift lever from bowl. Remove transmission indicator wire and neutral start switch. If equipped, remove the column mounted dimmer switch.

7. Depress lock plate using tool J-23653 and the steering wheel nut. Pry the round wire snap ring out of the shaft groove and discard ring. Remove the shaft lock plate. See Figure 3G-76.

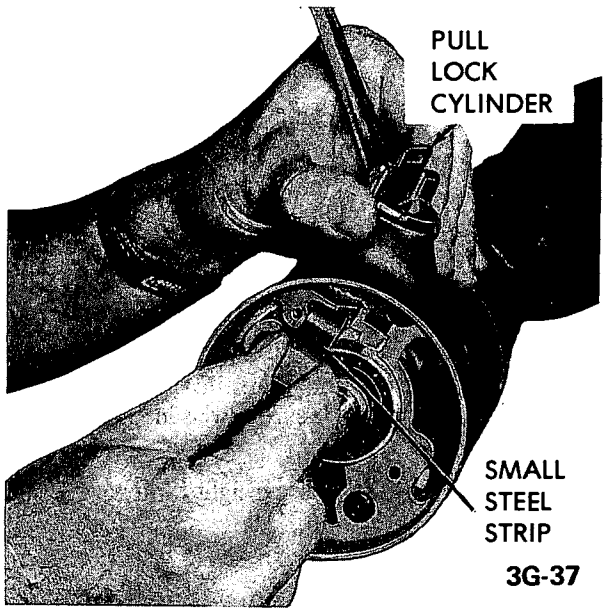


Figure 3G-103 - Signal Switch Wire Protector

8. Remove cancelling cam and cancelling cam spring.

9. Remove three turn signal switch mounting screws. Wrap a piece of tape around the upper part of the connector and wires to prevent snagging when removing switch. See Figure 3G-77.

10. Position shift bowl or shroud (if floor shift column) in "Low" position. Pull the switch straight up.

11. The lock cylinder should be removed in the "Run" position.

12. Insert a thin tool (small screwdriver or knife blade) into the slot next to the switch mounting screw boss (right-hand slot) and depress spring latch at bottom of slot, which releases lock. Remove lock. See Figure 3G-104.

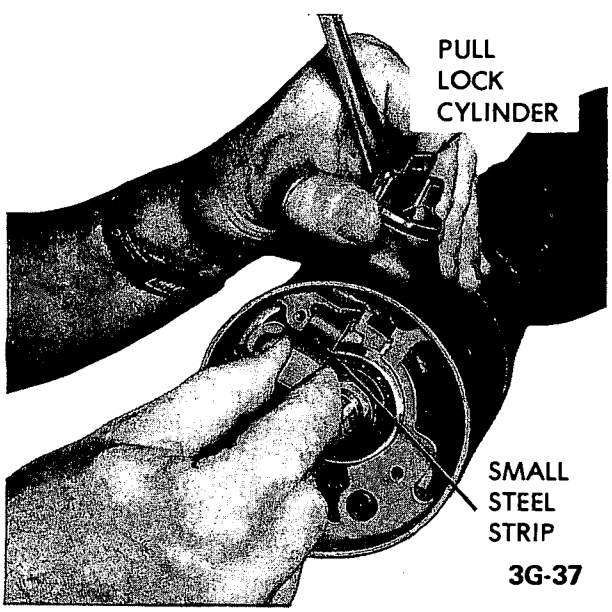


Figure 3G-104 - Removing Ignition Lock Cylinder

13. The buzzer switch can be pulled straight out of the housing. See Figure 3G-105. Do not pull on switch terminals. Use a bent wire or needle nose pliers to pull on switch clip. Pull clip with switch. If clip drops into column, further disassembly will be required to retrieve it.

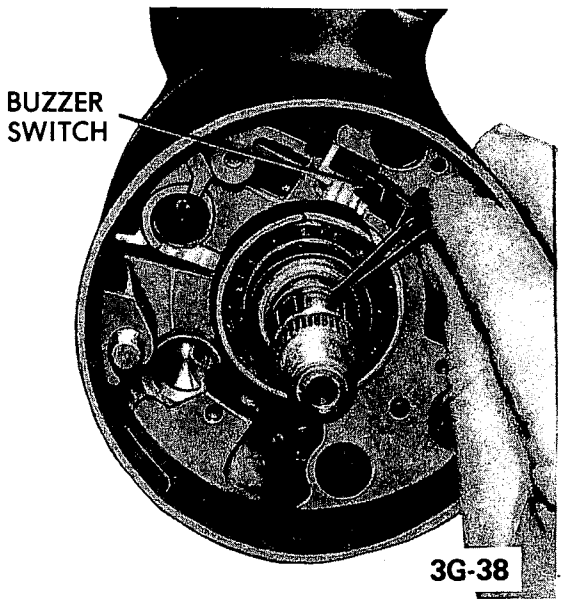


Figure 3G-105 - Removing Buzzer Switch

14. Remove three housing cover screws and remove housing cover.

15. Install tilt release lever and place column in full "Up" position. Remove tilt spring retainer using screwdriver blade that just fits into slot opening. Care should be observed when releasing tilt spring due to high compression rate of the spring. Insert screwdriver in slot, press in approximately 3/16 inch, turn approximately 1/8 turn counterclockwise until ears align with grooves in housing and remove spring and guide. See Figure 3G-106.

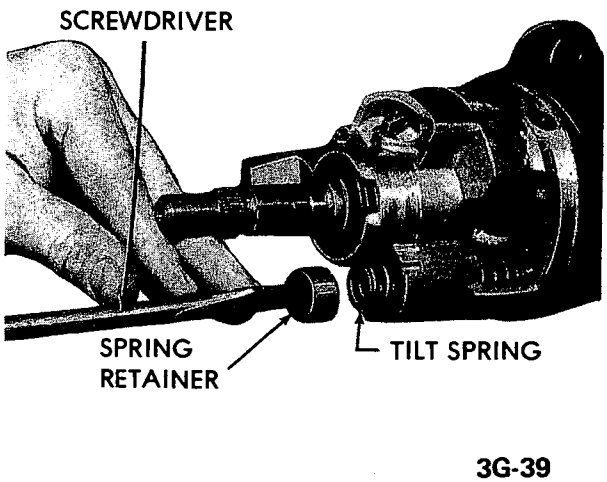


Figure 3G-106 - Removing Tilt Spring Retainer

16. With ignition switch in "Accessory" position, remove two ignition switch mounting screws and ignition switch. Remove two neutral-start switch screws and neutral-start switch.

17. Remove two pivot pins with Tool No. J-21854-1. See Figure 3G-107. Remove intermediate shaft assembly or lower flange so that shaft can be pulled up through column.

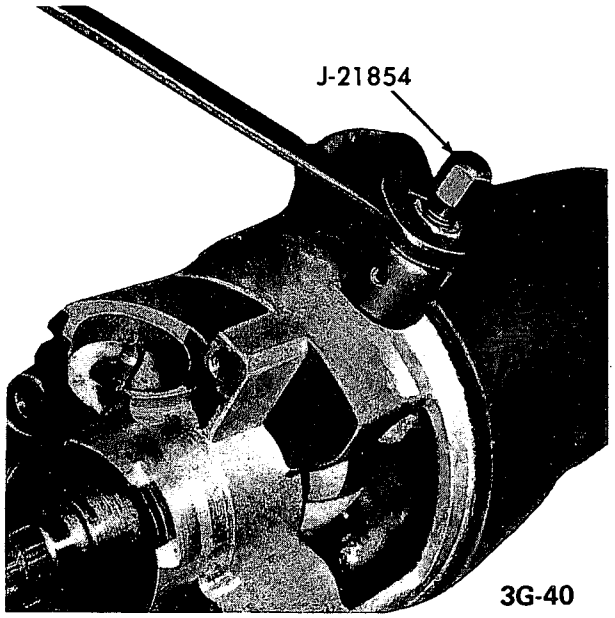


Figure 3G-107 - Removing Pivot Pin

18. Install tilt release lever place in full "UP" and disengage lock shoes. Remove bearing housing assembly by pulling upward to extend rack full down and moving housing assembly to the left to disengage rack from actuator. Remove actuator rod assembly.

19. Remove steering shaft assembly from upper end. Remove upper bearing race and inner seat.

20. Disassemble steering shaft assembly by removing centering spheres and anti-lash spring. See Figure 3G- 108.

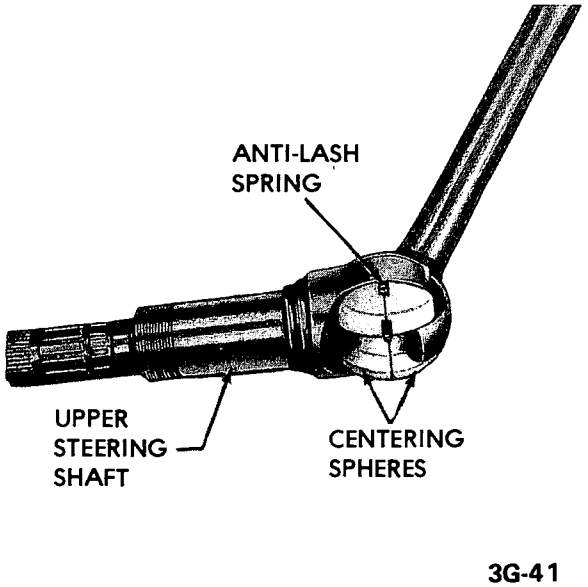


Figure 3G-108 - Steering Shaft and Centering Spheres

21. Remove four support screws and remove support assembly.

22. Remove shift tube retaining ring with screwdriver. Remove thrust washer.

Also remove clip, bearing adapter retainer and bearing adapter from lower end of housing.

23. Remove shift tube from bowl using Remover J-23072. Pilot adapter in upper end of shift tube and force tube out of bowl. Care should be taken not to jam lower shift lever into "T" slot on lower end of mast jacket while forcing out shift tube. Do not hammer or pull on lower or upper shift tube because plastic joint may be sheared. See Figure 3G-109.

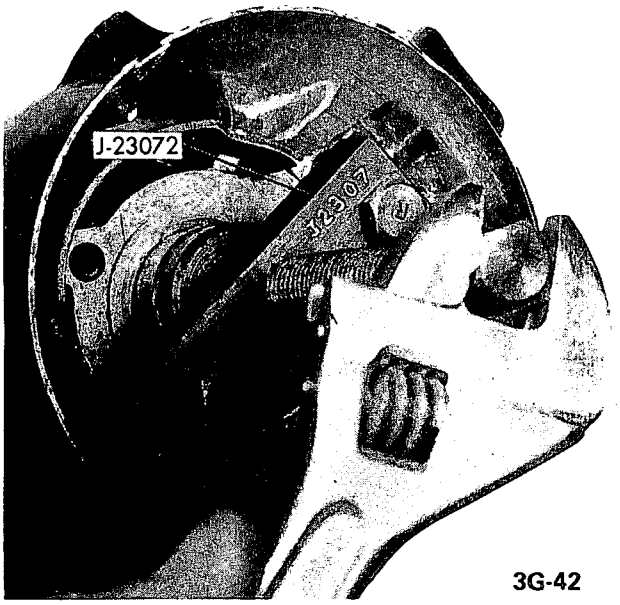


Figure 3G-109 - Removing Shift Tube

24. Remove shift tube assembly from mast jacket from lower end.

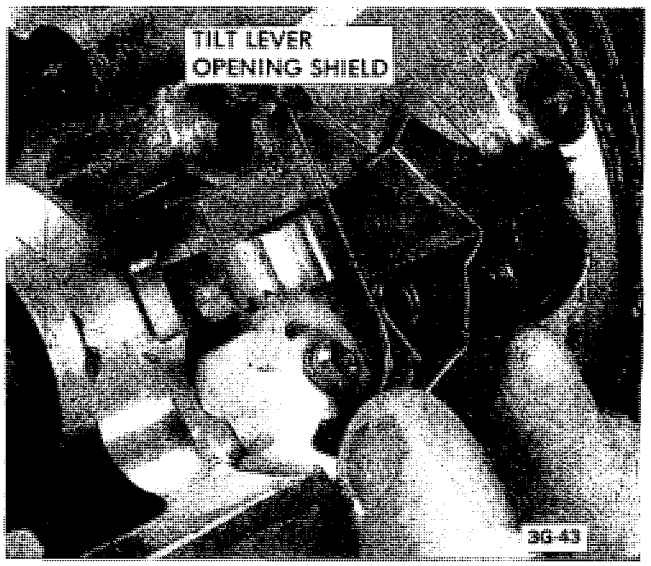


Figure 3G-110 - Removing Tilt Lever Opening Shield

25. Remove lock plate by sliding out of jacket notches and tipping down toward bowl hub at 12 o'clock position and under jacket opening. Remove wave washer.

26. Remove bowl from mast jacket. Remove shift lever spring from bowl by winding spring up with pliers and pulling out.

Bearing Housing Disassembly

1. Remove tilt lever opening shield from housing. See Figure 3G-110.

2. Remove lock bolt spring by removing spring retaining screw and moving spring clockwise to remove from bolt. See Figure 3G-111.

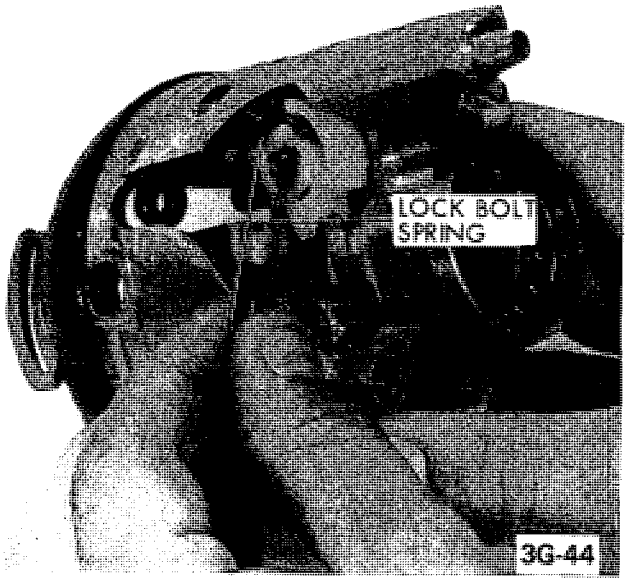


Figure 3G-111 - Removing Lock Bolt Spring

3. Remove snap ring from sector drive shaft. With small punch, lightly tap drive shaft from sector. Remove drive shaft, washer, sector and bolt. Remove rack and rack spring. See Figure 3G-112.

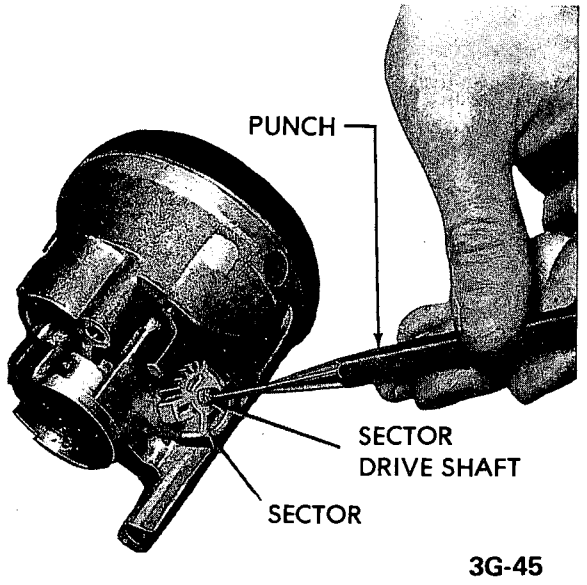


Figure 3G-112 - Removing Sector Drive Shaft.

4. Remove tilt release lever pin with pin punch and hammer. Remove lever and release lever spring. (To relieve load on release lever, hold shoes inward and wedge block between top of shoes (over slots) and bearing housing). See Figure 3G-113.

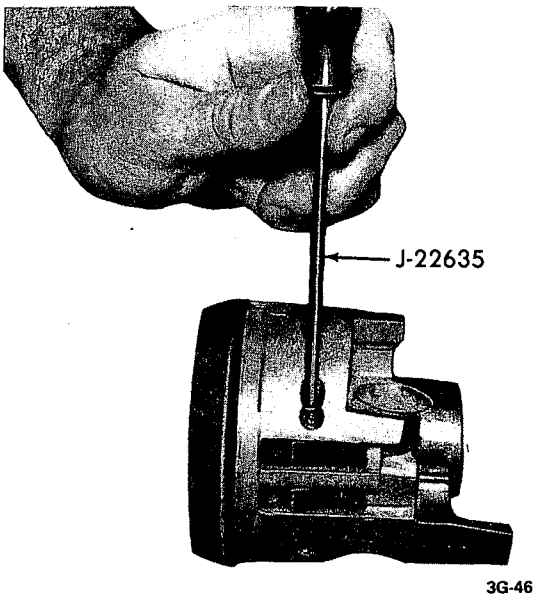


Figure 3G-113 - Removing Lock Shoe Pivot Pin

5. Remove lock shoe pin with punch and hammer. Remove lock shoes and lock shoe springs. See Figure 3G-114.

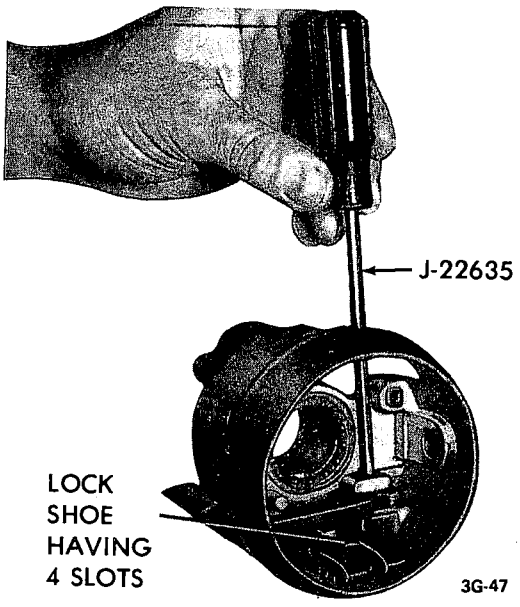


Figure 3G-114 - Removing Release Pin

6. Remove bearings from bearing housing only if they are to be replaced. Remove separator and balls from bearing. Place housing on work surface. With a pointed punch against back surface of race, carefully hammer race out of housing until bearing puller can be used. Repeat for other race. Do not reuse bearing.

CAUTION: *Fasteners in the following steps are important attaching parts in that they could affect the performance of vital components and systems, and/or could result in major repair expense. It must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part or lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.*

Apply thin coat Lithium Soap Grease to all friction surfaces.

1. Install bearings in bearing housing, if removed.

2. Install lock shoe springs, lock shoe and shoe pin in bearing housing. Use .180 inch diameter rod to line up shoes for pin installation.

3. Install spring, release lever and pin in bearing housing. (Relieve load on release lever as in Step 4 of disassembly procedure.)

4. Install washer and drive shaft in housing. Lightly tap sector onto the shaft far enough to install snap ring. Replace snap ring if it was removed.

5. Install lock bolt and engage with sector cam surface. See Figure 3G-115.

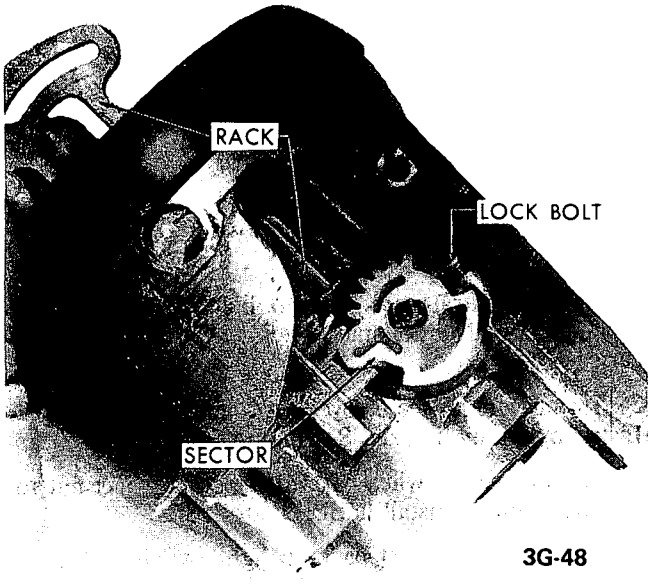


Figure 3G-115 - Engaging Block Tooth on Rack to Sector

6. Install rack and spring. Replace shim if one was used. Block tooth on rack to engage block tooth on sector. Install external tilt release lever.

7. Install bolt spring and spring retaining screw. Torque to 35 pound inch. See Figure 3G-111.

8. Install shift lever spring in bowl by winding up with pliers and pushing in. Slide bowl into mast jacket.

9. Install wave washer and lock plate in place. Work lock plate into notches in jacket by tipping lock plate toward hub at 12 o'clock position and under jacket opening slide lock plate into notches in jacket.

10. Carefully install shift tube in lower end of mast jacket. Align keyway in tube with key in bowl and using Installer J-23073, pull shift tube into bowl. See Figure 3G-116. Do not push or tap on end of shift tube.

Figure 3G-116 - Installing Shift Tube

11. Install thrust washer and retaining ring by pulling bowl up to compress wave washer.

12. Install support by aligning "V" in support with "V" notch in jacket. Insert screws through support in lock plate. Torque screws to 60 pound inch.

13. Align lower bearing adapter notches in jacket and push in lower end of mast jacket. Shift tube should pilot in adapter while this is done. Install adapter retainer and clip.

14. Install centering spheres and anti-lash spring in upper steering shaft. Install lower steering shaft from same side of spheres that spring ends protrude.

15. Install steering shaft assembly in shift tube from upper end. Carefully guide shaft through shift tube and bearing.

16. Install ignition switch actuator rod through bowl from bottom and insert in slot in support. Extend rack downward from bearing housing.

17. Assemble bearing housing over steering shaft and engage rack over end of actuator rod. See Figure 3G-117.

18. Install external tilt release lever and, holding lock shoes in disengaged position, assemble bearing housing over steering shaft until the pivot pin holes line up.

19. Install pivot pins. Assemble as far as possible using palm pressure of hand. Once started tap with a small hammer and punch.

20. Place housing in full "Up" position and install guide, tilt spring and tilt spring retainer, using screwdriver in

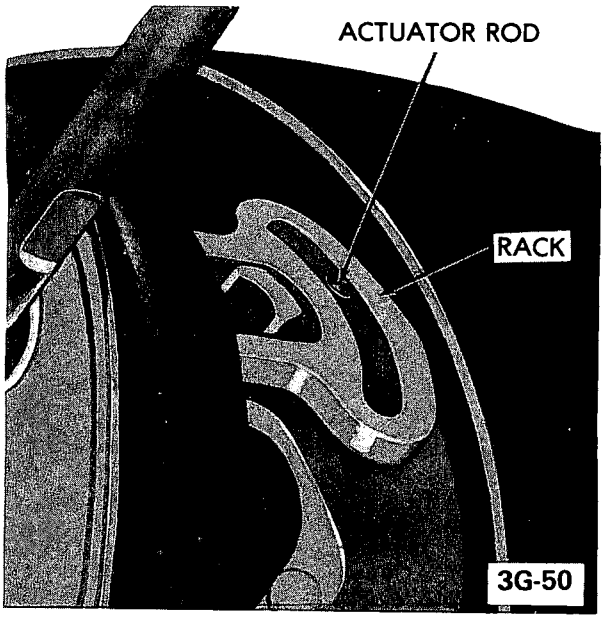


Figure 3G-117 - Installing Bearing Housing

retainer slot. Turn retainer clockwise to engage. Make sure there is grease between the guide and peg on support. See Figure 3G-106.

21. Install inner race and inner race seat.

22. Install tilt lever opening shield in housing. See Figure 3G-110.

23. Remove tilt release lever, install housing cover and seat screw at 12 o'clock position first. Tighten to 100 in-lbs, 3 screws.

24. Assemble buzzer switch to spring clip with formed end of clip under end of switch and spring bowed away from switch on side opposite contact. Push switch and spring into hole in cover to the step with the contacts toward lock cylinder bore.

25. Install turn signal switch wires and connector through cover, bearing housing and bowl. Push hazard warning knob in, install switch and torque screws to 25 pound inch. Short screw goes in hole nearest to lock cylinder.

26. Install wave washer (if one is used) and lower steering shaft flange or intermediate shaft assembly. Tighten pinch bolt to specified torque.

27. Install hazare warning knob and pull knob out. Install bearing inner race, seat, bearing preload spring, cancelling cam and lock plate.

28. Depress lock plate and install new retaining ring using Tool J-23653.

29. Install tilt release lever, signal switch lever (15 in-lbs.) and hazard warning knob (5 in-lbs.). Install upper shift lever and drive in pivot pin.

30. To install lock, hold lock cylinder sleeve and rotate knob clockwise against stop. Insert cylinder into cover bore with key on cylinder sleeve aligned to keyway in housing, push in to abutment of cylinder and sector. Rotate knob counterclockwise, maintaining a light push inward on cylinder, until drive section of cylinder mates with drive shaft. Push in until snap ring pops into groove and lock cylinder is secured in cover. Check freedom of rotation.

31. Install shaft lock cover and torque three screws to 15 lb.in.

32. When installing the ignition switch, be sure the lock cylinder is in "Acc" position. Position by moving slider to extreme right. Fit the actvator rod into slider hole and assemble to column. Lightly push switch down the column to take out lash in rod and tighten screws. Do not move switch out of detent. Tighten to 35 in-lbs. Figure 3G-118.

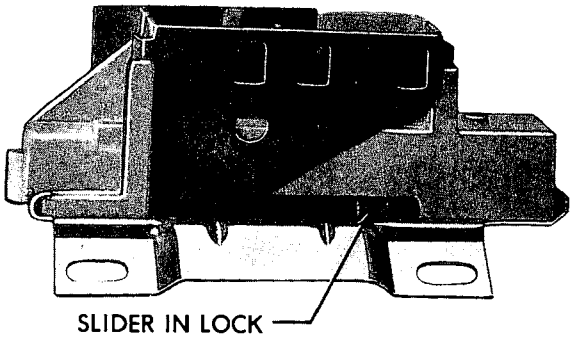


Figure 3G-118 - Ignition Switch Slider

33. Install neutral-start back-up light switch. Do not tighten screws. Neutral-start switch will be adjusted in the car.

34. Install wire protector over wires and on mast jacket. Install mounting bracket. See Figure 3G-103.

35. Install steering wheel. Torque steering wheel nut to specified torque. Install horn actuator parts.

36. Adjust neutral-start back-up light switch with shift lever in "Drive" position.

DISASSEMBLY AND ASSEMBLY OF FUNCTION LOCKING TILT AND TELESCOPING COLUMN

Disassembly

1. Disconnect at flexible coupling - remove column from car.

2. Remove column mounting bracket from column and SET ASIDE TO PROTECT BREAKAWAY CAPSULES.

3. Mount assembly in vise.

4. Remove steering wheel nut, retaining ring and wheel. Use wheel puller. DO NOT HAMMER ON END OF

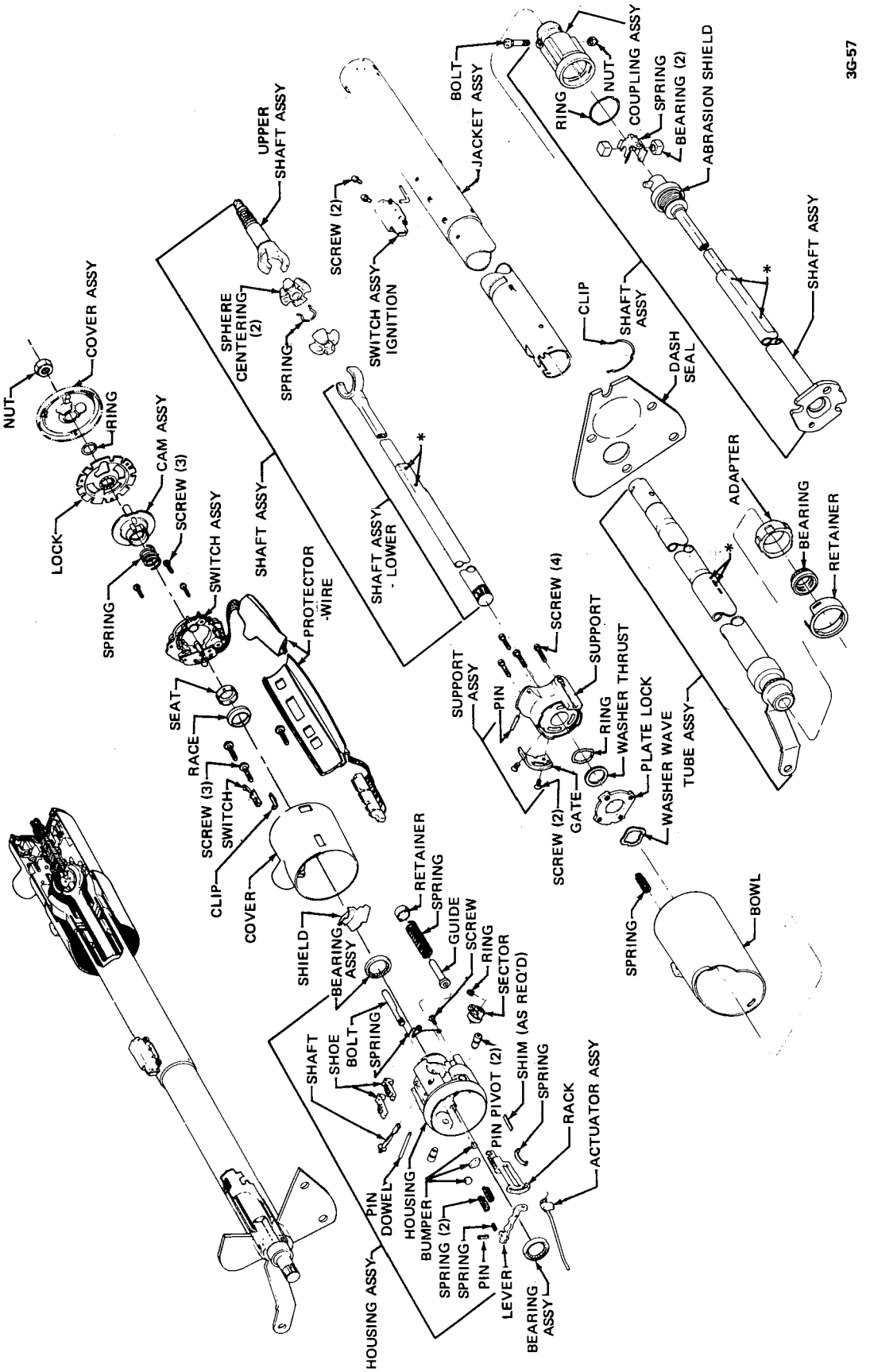


Figure 3G-119 Function Locking Tilt Steering Column

STEERING SHAFT AS THIS COULD LOOSEN THE PLASTIC INJECTIONS.

5. Remove signal switch wire protector. DO NOT DAMAGE WIRES. Wrap tape around connectors and upper part of wires to prevent snagging when removing switch. Figure 3G-77.

6. Remove tilt release lever, signal switch lever and hazard warning knob. Remove indicator wire, if automatic transmission column. Depress hazard warning switch after knob removal. Remove upper shift lever from bowl. Remove bumper and "C"-ring retainer. Pry up carefully to avoid damage to retainer. Remove neutral start switch.

7. Use carrier and spring removal J-23063 and pull "C" ring, shaft lock, carrier and spring. Figure 3G-120. If there is an Allen plug in the upper shaft, remove and discard.

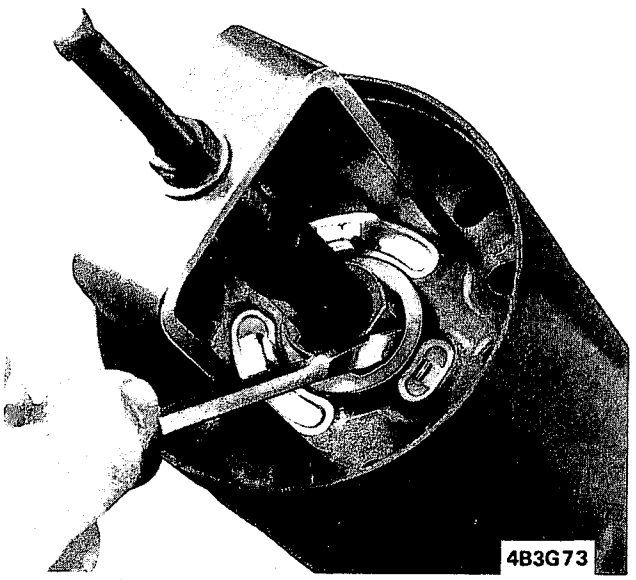


Figure 3G-120 Removing "C" Ring

8. Remove three switch mounting screws.

9. Position shift bowl or shroud (if floor shift column) in "low" position. Pull the switch straight up.

10. The lock cylinder should be removed in the "Run" position.

11. Insert a thin tool (small screw driver or knife blade) into the slot next to the switch mounting screw boss (Right-hand slot) and depress retainer at bottom of slot, which releases lock. Remove lock Figure 3G-121.

12. The buzzer switch can be pulled straight out of the housing Figure 3G-122. A flat spring wedges the switch toward the lock cylinder Figure 3G-123. If buzzer switch clip falls into column, further disassembly will be required to retrieve it.

13. Remove three housing cover screws and remove housing.

14. Reinstall tilt release lever and place column in full

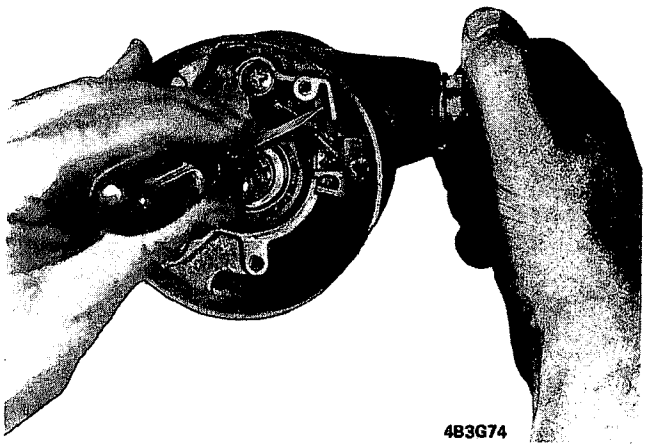


Figure 3G-121 Removing Lock

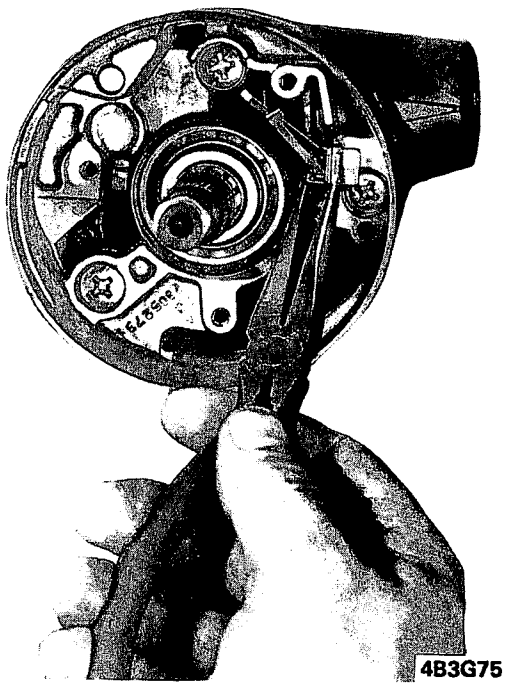


Figure 3G-122 Remove Buzzer Switch

"up" position. Remove tilt spring retainer using screw driver blade that just fits into slot opening. Insert screw driver in slot, press in approximately 3/16", turn approximately 1/8 turn counterclocwise until ears align with grooves in housing, remove spring and guide (Figure 3G-124).

15. Remove clip, bearing adapter retainer and bearing adapter assembly at lower end of jacket.

16. Remove seat and upper bearing inner race.

17. With ignition switch in "Acc" position, remove two ignition switch mounting screws and ignition switch.

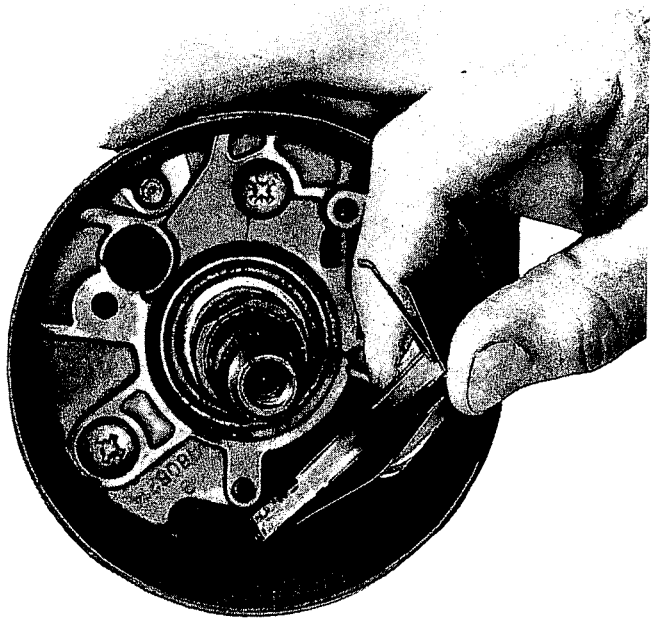


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Figure 3G-123 Position of Buzzer Switch and Spring Retainer

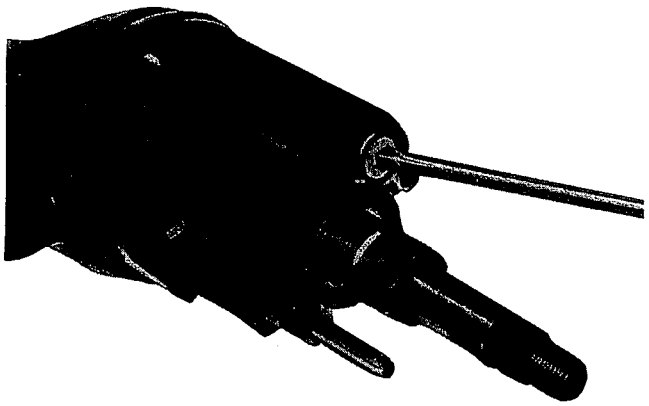

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Figure 3G-124 Remove Tilt Spring Retainer

Remove two neutral-start switch screws and neutral-start switch.

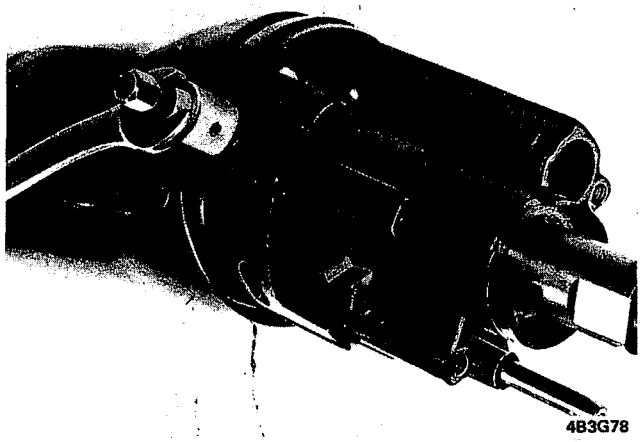

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Figure 3G-125 Removing Pivot Pins

18. Remove two pivot pins with tool J-21854-1 (Figure 3G-125).

19. Disengage lock shoes by pulling on release lever. Remove bearing housing assembly by pulling upward to extend rack full down and moving housing assembly to the left to disengage rack from actuator. Remove actuator rod assembly. Remove lower flange or intermediate shaft first.

20. Remove steering shaft assembly.

21. Disassembly steering shaft assembly by removing centering spheres and anti-lash spring.

22. Disassembly upper steering shaft, locking wedge and locking rod from upper yoke.

23. Remove four support screws and remove support assembly.

24. Remove shift tube retaining ring with screw driver. Remove thrust washer.

If service is required on upper end only, steps 1 through 24 may be performed in the car if vehicle configuration permits. It is necessary to remove the mounting bracket to service the signal switch.

25. Remove shift tube from bowl (use tool J-23072) (Figure 3G-126). Pilot sleeve in upper end of shift tube and force tube out of bowl. Care should be taken not to jam lower shift lever into lower jacket. Lever must be aligned with "T" slot to remove shift tube. DO NOT HAMMER OR PULL ON LOWER OR UPPER SHIFT TUBE BECAUSE PLASTIC JOINT MAY BE SHEARED.

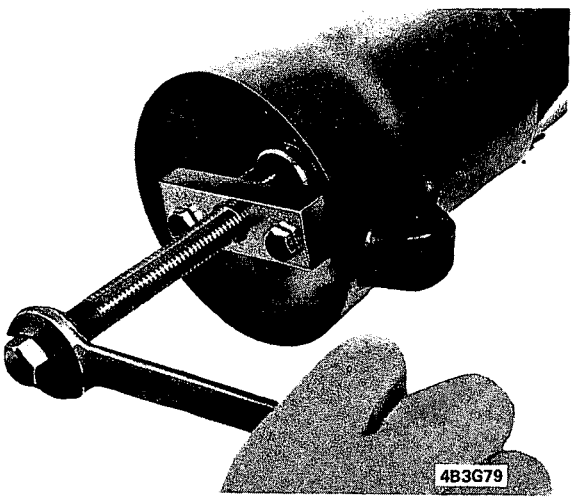

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Figure 3G-126 Removing Shift Tube

26. Remove shift tube assembly from jacket from the lower end.

27. Remove lock plate by sliding out of jacket notches and tipping down toward bowl hub at 12 o'clock position and under jacket opening. Remove wave washer.

28. Remove bowl from jacket. Remove shift lever spring from bowl by winding spring up with pliers and pulling out.

Bearing Housing Disassembly

29. Remove tilt lever opening shield and turn signal lever opening shield from housing Figure 3G-127.

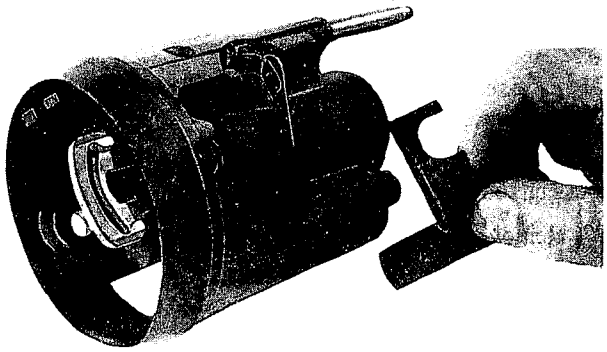

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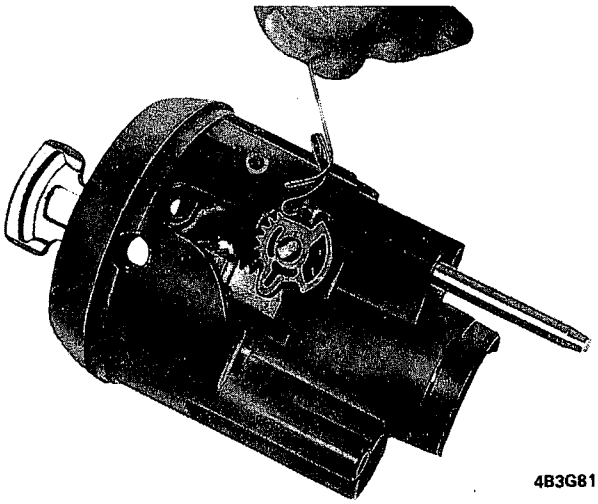
Figure 3G-127 Opening Shield

30. Remove lock bolt spring by removing spring retaining screw and removing spring clockwise to remove from bolt Figure 3G-128.



4B3G81

Figure 3G-128 Lock Bolt Spring

31. If there is a snap ring, remove it from sector drive shaft. With small punch, lightly tap drive shaft from sector Figure 3G-129. Remove drive shaft. Remove rack and rack spring (also shim if there is one). Remove sector and bolt.

32. Remove tilt release lever and with punch and hammer, remove lever and release lever spring (to relieve load on release lever, hold shoes inward and wedge block between top of shoes (overslots) and bearing housing).

33. Remove lock shoe pin with punch and hammer. Remove lock shoes and springs.

34. Remove bearings from bearing housing only if they are to be replaced. Remove separator and balls from bearings.

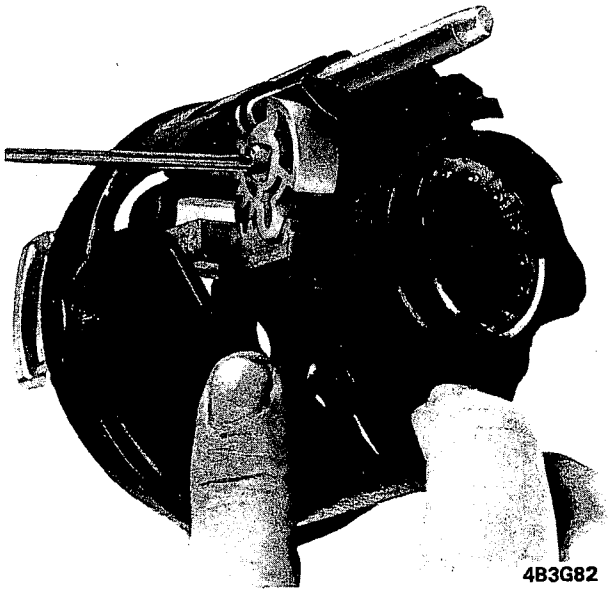


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Figure 3G-129 Removing Drive Shaft

Place housing on work surface. With a pointed punch against back surface of race, carefully hammer race out of housing until bearing puller can be used. Repeat for other race. Do not re-use bearings.

Assembly

Apply thin coat of lithium grease to all wear surfaces except the lock bolt and lock bolt hole.

1. Install new bearings in bearing housing, if removed.

2. Install lock shoe springs, lock shoe and shoe pin in bearing housing. Use approximately .180 rod to line shoes for pin installation.

3. Install spring, release lever and pin in bearing housing. (Again, relieve load on release lever in Step 31 of disassembly procedure).

4. Install drive shaft in housing. Lightly tap sector onto the shaft far enough to expose snap ring groove. Replace snap ring if one was removed.

5. Install lock bolt and engage with sector cam surface. (Figure 3G-128)

6. Install rack spring and rack. (Replace shim if one was removed.) Block tooth on race to engage block tooth on secotr. Install external tilt release lever.

7. Install bolt spring and spring retaining screw. Tighten to 35 inch-pounds.

8. Install shift lever spring in bowl by winding up with pliers and pushing in. Slide bowl into mast jacket.

9. Install wave washer and lock plate in place. Work lock plate into notches in jacket by tipping lock plate toward bowl hub at 12 o'clock position and under jacket opening. Slide lock plate into notches in jacket.

10. Carefully install shift tube in lower end of jacket. Align key in tube with keyway in bowl and use tool No. J-23073 to pull shift tube into bowl.

CAUTION: *DO NOT PUSH OR TAP ON END OF SHIFT TUBE.* Install thrust washer

and retaining ring by pulling bowl up to compress wave washer.

11. Install support by aligning "V" in support with "V" notch in jacket. Insert screws through support into lock plate. Tighten screws to 60 inch-pounds torque.

12. Align plastic fingers with holes in jacket and push lower bearing adapter assembly in lower end of mast jacket. Shift tube should pilot in adapter while this is done. Install adapter, retainer and clip.

13. Install upper steering shaft, locking wedge, and locking rod in yoke.

14. Install centering spheres and anti-lash spring in upper steering shaft. Install lower steering shaft from same side of spheres that spring ends protrude.

15. Install steering shaft assembly in shift tube from upper end. Carefully guide shaft through shift tube and bearing.

16. Install ignition switch actuator rod through bowl from bottom and insert in slot in support. Extend rack downward from bearing housing. Assembly bearing housing over steering shaft and engage rack over end of actuator rod.

17. Hold lock shoes in disengaged position assemble bearing housing over steering shaft until the pivot pin holes line up with the holes in the support.

18. Install pivot pins using same procedure as outlined on tilt column section.

19. Place housing in full "up" position and install guide, tilt spring and tilt spring retainer using screw driver in retainer slot. Turn retainer clockwise to engage.

20. Install tilt lever opening shield and turn signal lever opening shield in housing.

21. Remove tilt release lever, install housing cover and seat screw at 12 o'clock position first. Tighten to 100 inch-pounds - 3 screws.

22. Assemble buzzer switch to spring clip with formed end of clip under end of switch and spring bowed away from switch on side opposite contact. Push switch and spring into hole in cover to the step with the contact toward lock cylinder bore.

23. Install signal switch wires and connector through cover bearing housing and bowl. Push hazard warning knob in and push end of hazard warning actuator (flanged edges toward housing) into hole in hazard warning knob. Install switch while carefully guiding hazard warning actuator into cover and tighten screws to 25 inch-pounds.

24. Install wave washer and lower steering flange, if used. Tighten pinch bolt to 30 foot-pounds. If not used, connect pot joint to steering shaft and tighten pot joint pinch bolt nut to 50 foot-pounds.

25. Use J-23063 tool and install race, spring, carrier, shaft lock and "C" ring. Locate "C" ring to lock shaft as shown in Figure 3G-130, with the wider leg of the "C" rig on the keyway side of the yoke. Install "C" ring retainel with single tab opposite small lobe on carrier. Snap retainer over "C" ring and install bumper.

26. To install lock, hold lock cylinder sleeve and rotate knob clockwise against stop. Insert cylinder into cover bore with key on cylinder sleeve aligned to keyway in

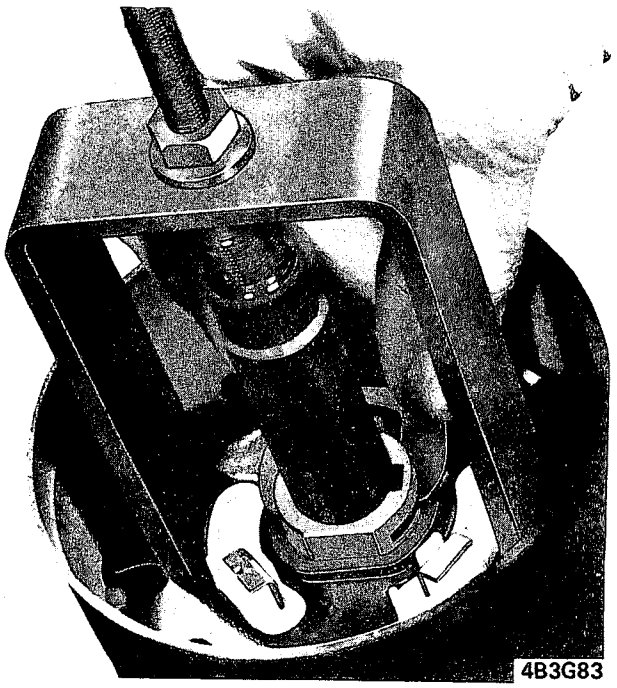

Figure 3G-130 Installing "C" Ring

housing, push in to abutment of cylinder and sector. Rotate knob counterclockwise, maintaining a light push inward on cylinder, until drive section of cylinder mates with drive shaft. Push in until retainer pops into groove and lock cylinder is secured in cover. Check freedom of rotation.

27. Install tilt release lever (20 inch-pounds), signal switch lever (30 inch-pounds), and hazard warning knob (5 inch-pounds). Install upper shift lever and drive in pivot pin.

28. When replacing the ignition switch, place the lock in "Acc" position. Place the switch in "Acc using the following procedure:

(1) Position the switch as tilt column.

(2) Move the slider to the extreme right. Fit the actuator rod into the slider hole and assemble to the column with two screws. Lightly push the switch down the column (away from the steering wheel), to take out lash in the actuator rod, and tighten mounting screws. Caution should be exercised to prevent moving the switch out of detent. Use only the correct screws and tighten to 35 inch-pounds.

29. Install neutral-start switch and back-up light switch. Do not tighten screws. Neutral-start switch will be adjusted in the car at 20 inch-pounds torque at final assembly. DO NOT USE SUBSTITUTE SCREWS.

30. Install lower wire protector over wires and on jacket.

31. Install mounting bracket DO NOT USE SUBSTITUTE BOLTS. (Bolt torque, 15 foot-pounds).

32. Install steering wheel. Torque steering wheel nut to 30 foot-pounds.

33. Install horn parts.

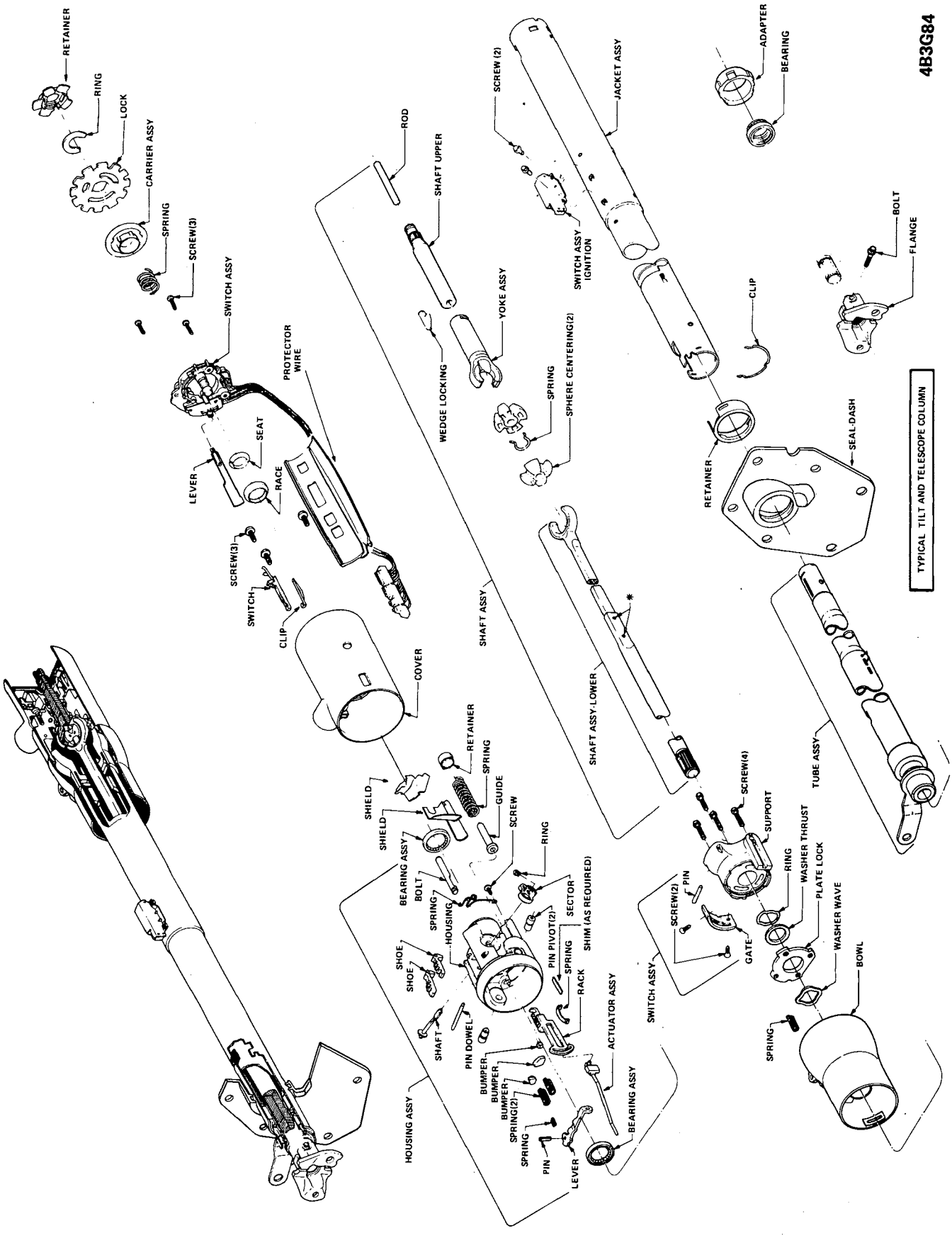

Figure 3G-131 Function Locking Tilt and Telescoping Column

SPECIFICATIONS

SPECIFICATIONS

Pinch Bolt, fabric coupling to Steering Gear	30 ft-lb
Pinch Bolt, demountable flange to Steering Gear	30 ft-lb
Nuts, fabric coupling	20 ft-lb
Bolt & Nut, pot coupling clamp – 1"	50 ft-lb
Bolt & Nut, pot coupling clamp – 5/8"	35 ft-lb
Spring Retaining Screw	35 in-lb
Support Screws	60 in-lb
Housing Screws	
Optional	100 in-lb
Standard	60 in-lb
Signal Switch Mounting Screws	25 in-lb
Shaft Lock Cover Screws	15 in-lb
Ignition Switch Mounting Screws	35 in-lb
Neutral Start Mounting Switch Screws	
Optional	20 in-lb
Standard	15 in-lb
Tilt Release Lever Screw	30 in-lb
Hazard Warning Knob	5 in-lb
Steering Wheel Nut	30 ft-lb
Signal Switch Lever Screw	15 in-lb
Shift Gate Mounting Screws	45 in-lb
Bearing Screws (Synchro)	90 in-lb