

SAGINAW STEERING COLUMNS

American Motors
Chrysler (Tilt Wheel Only)
General Motors

DESCRIPTION

Saginaw steering columns are available for both floor shift and column shift vehicles. Construction and maintenance of these 2 types of columns is the same except for the addition of a shift lever, tube and related components on column shift models. Both types of steering columns are available in 3 configurations: Standard fixed position column, tilt column with 6 positions as well as a tilt and telescope column designed to tilt, extend and retract. All steering columns are designed with an integral ignition lock switch. This lock secures the steering wheel (and shift linkage on column shift models) to prevent theft.

Under head-on collision conditions, columns are designed to telescope at a controlled rate. If driver is thrown forward into steering wheel, column can telescope further at same controlled rate. Incorporated into columns is a two piece telescoping transmission gear shift tube interconnected by plastic inserts and shear pins, and a two piece telescoping steering shaft with upper and lower sections connected by plastic collars and pins. A mounting bracket connecting steering column and instrument panel, allows column to slide forward on impact, but blocks rearward movement towards driver.

CAUTION — All elements of energy absorbing columns are sensitive to damage and must be handled with care to avoid stresses to the column which could shear or loosen the fasteners which provide column rigidity. It is imperative that only fasteners of the same or equivalent part number be used if replacement becomes necessary. Improper fasteners or non-specified torque values could result in failure of the unit.

INSPECTION

COLUMN SUPPORT & COMPONENTS

Column Support Bracket — Damage of bracket is indicated by separation of two break-away capsules which allow column to slip forward under severe impact. If capsules have moved more than $\frac{1}{16}$ " , some column collapse may have occurred. Replace damaged brackets and inspect column for collapsed jacket or steering shaft components.

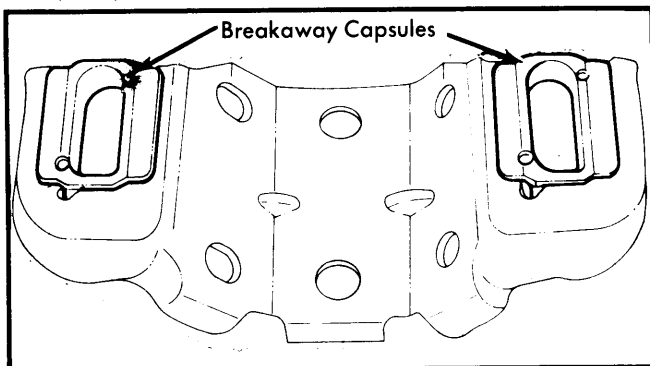


Fig. 1 Column Mounting Bracket

Column Jacket — Inspect jacket section of column for looseness, bends, collapsed mesh or bellows section. With General Motor's models, check for mast jacket collapse by measuring the distance from edge of the back-up switch win-

dow to the lower edge of upper jacket. See Fig. 2 for proper dimensions.

Shifter Shaft — Separation of shift tube or shaft assembly cannot be visually inspected without column disassembly. On cars with automatic transmissions and column shift lever, if lever can be moved to "Park" position without raising lever it is an indication that upper shift tube plastic bearing is broken.

Steering Shaft — Inspect intermediate shaft and steering column shaft for injected plastic pins being sheared. The shafts will rattle when struck lightly from side and some lash may be felt when rotating steering wheel and holding coupling.

STEERING SHAFT & COUPLING ALIGNMENT

Flexible Fabric Coupling — Steering gear and column shaft must be in alignment to avoid coupling binding and metal-to-metal contact between shaft flanges. An improperly aligned column or steering gear may cause increased turning effort, directional pointing, lumpiness or popping noise. A hissing noise common to rotary valve power gears can be carried through steering shaft and inside vehicle if metal-to-metal contact exists at coupling. Coupling flange components should have at least $\frac{1}{16}$ " to $\frac{1}{8}$ " operating clearance at all times.

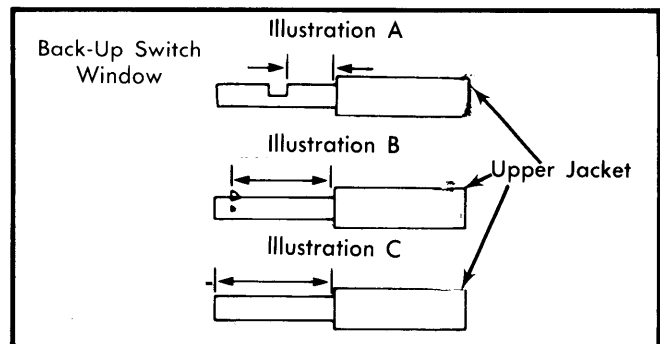


Fig. 2 G.M. Column Collapse Measurement

GM Column Collapse Measurements

Model	Illustration	Measurement
Rear Wheel Drive		
Standard Column		
Bonneville, Cutlass, Grand Prix, Monte Carlo & Regal ..	A	$1\frac{5}{8}$ "
Camaro & Firebird	B	$10\frac{5}{16}$ "
All Others	A	$3\frac{1}{2}$ "
Tilt Column		
Bonneville, Cutlass, Grand Prix, Monte Carlo & Regal ..	A	2"
Camaro & Firebird	B	$10\frac{3}{16}$ "
All Others	A	4"
Tilt & Telescope		
Fleetwood Limousine	A	$11\frac{5}{16}$ "
All Others	A	$3\frac{3}{8}$ "
Front Wheel Drive		
Standard & Tilt Column		
Cavalier, Cimarron, J2000, Firenza & Skyhawk ...	C	$5\frac{1}{8}$ - $5\frac{1}{4}$ "
All Others	C	$4\frac{15}{16}$ -5"

SAGINAW STEERING COLUMNS (Cont.)

REMOVAL & INSTALLATION

CAUTION — When working on a collapsible steering column, do not bump or hammer on column components. With column removed from mounts, it is extremely susceptible to impact damage. A slight impact on column end may collapse steering shaft or loosen plastic injections which maintain column rigidity. When removing steering wheel, use a suitable puller but do not hammer on puller to aid removal.

Removal — 1) Center steering wheel and disconnect battery ground cable. Remove steering coupling shield if equipped. Disconnect steering shaft at flexible coupling or pot joint. Note coupling bolt size and location and mark shafts for reassembly reference. For vehicles with a universal joint and intermediate shaft, disconnect flex coupling and remove shaft. Disconnect column shift linkage from lever(s).

2) Remove steering wheel if necessary for removal clearance. Remove column trim pads, shrouds and instrument panel covers as required. Disconnect all electrical wiring to steering column and vacuum lines if equipped with automatic parking brake release on column. Disconnect shift quadrant cable or link from column shift bowl if equipped.

3) Move seat back as far as possible to provide removal clearance. **CAUTION** — Do not remove upper support first, as column may bend under its own weight. Remove floor pan trim cover and column lower supports. Remove bolts attaching upper bracket to column. Note number and position of shims for reinstallation. Remove column bracket fasteners and lower column. Disconnect wiring from ignition switch, turn signal switch and neutral start switch (if equipped). Carefully remove column guiding column shift levers through firewall.

NOTE — Correct column installation is important to prevent stress on collapsible components during mounting.

Installation — 1) Install upper column mounting bracket on column and tighten screws. Install toe pan seals over column if equipped. Install column assembly through floor pan, align steering shaft marks, engage coupling and tighten bolts. **NOTE** — Do not apply end loads to steering shaft.

2) Raise column and connect all electrical wiring and vacuum hoses (if equipped) between column and body. Loosely install bracket fasteners to hold column to instrument panel support. Install lower column toe pan seals, toe pan, clamp or screws. Tighten bolts and screws as required. Connect shift quadrant cable or link. With steering shaft coupling bolts tight and toe pan bolts tight, tighten upper column bracket-to-instrument panel support fasteners. **CAUTION** — Do not tighten column mounting bolts unless vehicle is on its wheels or suspension.

3) Inspect flexible coupling alignment making sure there is no distortion due to pot joint bottoming in either direction. The steering wheel should be free to rotate smoothly (front wheels off ground). If column coupling alignment is required, loosen column mounting and adjust as required. If vehicle has had

frame damage, it may be necessary to loosen steering gear to adjust coupling alignment.

4) Install steering wheel and components if removed. Connect transmission shift linkage and adjust as required. Check adjustment of neutral start switch (if equipped). Adjust shift quadrant indicator if necessary. Install instrument panel covers, shrouds and column trim pads. Connect battery ground cable and test steering column for proper operation.

DISASSEMBLY

STEERING COLUMN

NOTE — Disassembly and reassembly procedures for standard and tilt columns are similar. Some procedures for tilt columns do not apply to standard columns. If in doubt as to whether or not a part or procedure applies to the column being serviced, see Fig. 7 and Fig. 8.

1) Disconnect battery ground cable and remove steering wheel. Remove column if necessary. Remove steering shaft lock cover. Install suitable tool (J-23653) on steering shaft and remove lock plate "C" ring. Remove lock plate, cancelling cam and upper bearing preload spring. Remove dimmer switch actuator arm (if equipped).

2) Unscrew hazard warning knob. Remove 3 switch mounting screws and pull the switch connector out of bracket on column jacket. Feed connector through column support bracket and pull switch straight up. Remove wire harness protector with pliers. Pull switch straight up, guiding wire harness and cover through column housing.

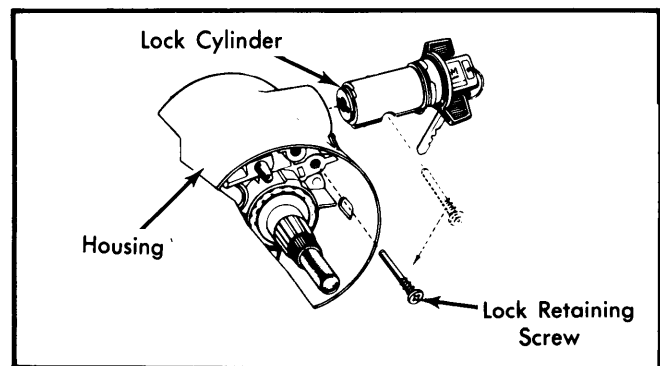


Fig. 3 Ignition Lock Cylinder Removal (Retaining Screw Type)

3) Turn ignition switch to "RUN" position, remove key warning buzzer switch retainer clips and buzzer switch. DO NOT drop buzzer retainer clip into column. Remove screw securing lock cylinder and remove lock cylinder by pulling it out. Remove tilt lever and cover-to-housing screws. If equipped with dimmer on column, remove cap and actuator rod. Use punch to remove pivot pin, then lift out pivot assembly.

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NOTE — The lock cylinder on some models is retained with a spring loaded retaining tab. To remove lock cylinder on these models, depress tab with a screwdriver and withdraw lock cylinder from housing. See Fig. 4.

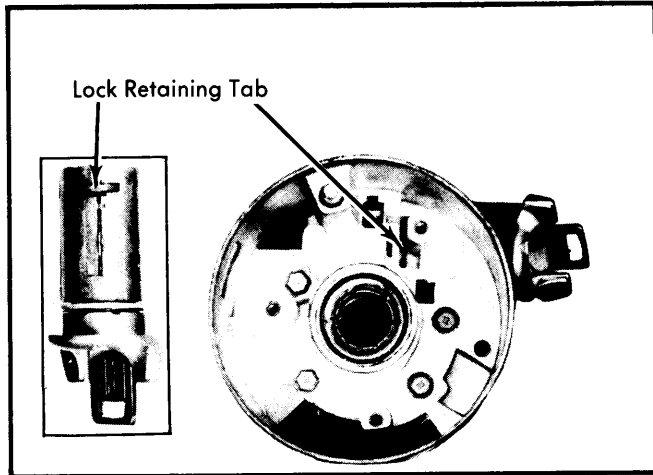


Fig. 4 Ignition Lock Cylinder Removal (Retaining Tab Type)

4) Remove wiper switch, if equipped. Remove lock spring screw, then move rack assembly upward. Turn spring clockwise until disconnected from steering shaft lock bolt, and remove spring. Remove sector snap ring and remove sector with a pin punch by driving out cylinder lock shaft. Lock bolt can now be removed from housing. Remove lock drive shaft through lock assembly opening. Install tilt lever and move column up. Remove tilt spring assembly using a screwdriver. Press in and turn retainer counterclockwise about $\frac{1}{8}$ turn to remove tilt spring.

5) Remove housing upper bearing seat and race. Install suitable pivot pin removal tool (J-21854-1), and remove pivot pins. Lift tilt lever to release lock shoes. Pull upward on housing to extend rack fully down, then move housing to left to disengage rack from actuator and remove housing from column. Remove rack and spring from housing (do not lose spring shim if equipped). Using suitable pin punch (J-22635), drive out tilt release lever pin and remove lever and spring. Drive out lock shoe pin and remove shoes and springs.

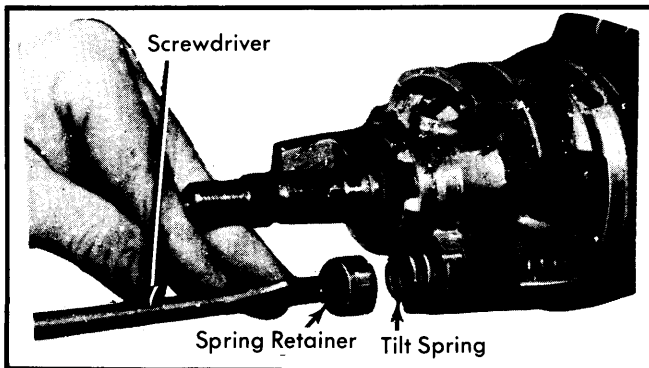


Fig. 5 Removing Tilt Spring Retainer

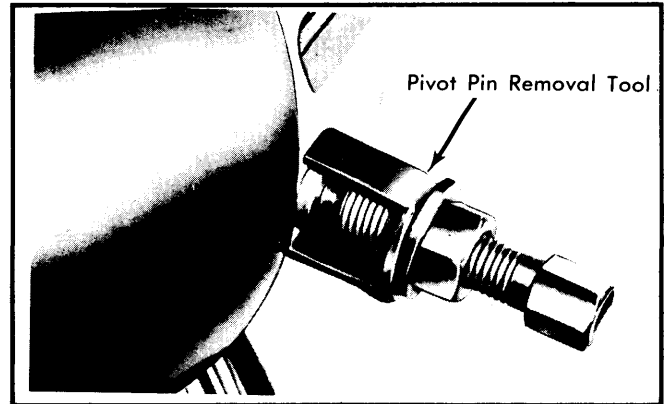


Fig. 6 Tilt Column Pivot Pin Removal

6) With telescoping type columns, remove upper shaft from upper yoke by releasing locking rod and pulling shaft out. Remove locking wedge and rod. With all columns, to remove complete steering shaft assembly, disconnect and remove lower shaft coupling, bearing components and spacer (if equipped). Carefully pull steering shaft from column upper end. **NOTE** — If service is required on yoke or centering sphere assembly only, it is not necessary to remove steering shaft completely from column. To disconnect steering shaft spheres, turn yoke 90° to centerline of lower shaft, align flats on centering sphere with lower shaft and remove upper yoke with centering sphere. Remove sphere from yoke by rotating sphere so flats align with yoke opening.

7) Remove shift lever by driving out pin and pulling lever from bowl. Remove four screws attaching support to lock plate and remove support. Remove shift gate attaching screws and remove shift gate from support. Remove ignition switch as follows: Remove toe-pan trim cover and loosen toe-pan clamp bolts. Remove nuts from column bracket and lower column. Place the ignition key lock cylinder in "LOCK" position before proceeding. **NOTE** — If lock cylinder has already been removed, the actuating rod to ignition switch should be pulled up until it stops and then pushed down one detent, which is "LOCK" position. Remove switch screws and remove ignition switch. Remove actuator rod through bowl from upper end of column.

8) The following steps for bowl and/or shift tube removal require column removal. With column removed from vehicle, remove ignition switch, neutral start and back-up switch (if equipped). Remove retaining ring, cover, bearing and adapter from column lower end. Remove shift tube retaining ring and thrust washer. Remove lower shift tube support screws (if equipped).

9) Position suitable puller (J-23072) in bowl and turn bolts into lock plate about six turns. Turn center tool bolt while guiding shift lever through slot in jacket. Separate shift tube and bowl. Mark location of lock plate and remove lock plate and wave washer. Slide shift tube out column lower end.

REASSEMBLY

CAUTION — Components and fasteners used in steering column design are important in that they can affect vehicle safety and the performance of vital systems if not serviced properly. All replacement parts must be of equal part number.

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or equivalent quality. DO NOT use a part of lesser quality or substitute design.

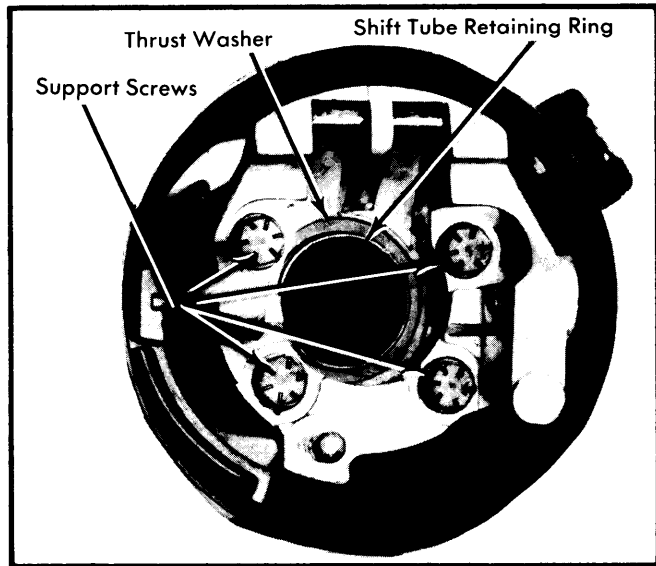


Fig. 9 Support & Shift Tube Mounting

STEERING COLUMN

1) Mount column in a suitable holding fixture or clamp onto two weld nuts with a vise. During reassembly, apply a thin coat of lithium grease to all friction parts. Install shift lever spring into housing if equipped. With floor shift models, install plunger. With tilt only columns, slide the gearshift lever housing onto mast jacket. With tilt-telescoping columns, install transmission control lock tube housing extension and tighten screws. Install housing cover so the three cover tabs enter slots in housing extension. Install housing onto mast jacket assembly. **NOTE** — Do not hammer on end of shift tube.

2) Install bearing support lock plate wave washer. Install bearing support lock plate sliding it under jacket opening. Slide lock plate into notches in jacket. Insert shift tube into lower end of mast jacket. Align keyway in tube with key in shift lever housing. Insert suitable shift tube installer tool (J-23073) in shift tube and turn tool to tighten swivel (see illustration). With tool installed as shown, turn nut on tool while guiding shift lever through jacket slot, and pull shift tube into housing. Remove tool.

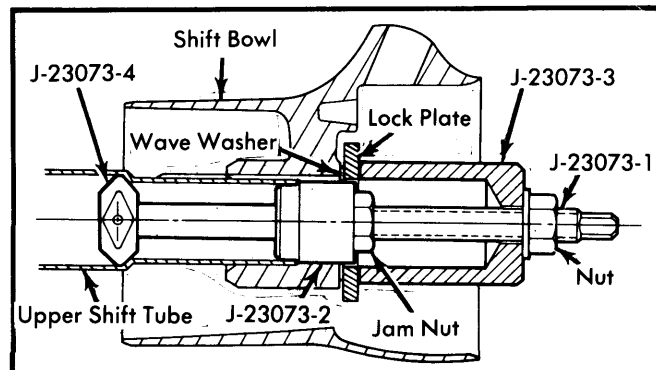


Fig. 10 Shift Tube Installation. Install Tool as Shown and Turn Nut to Press Shift Bowl onto Tube.

3) Install bearing support thrust washer and retaining ring by pulling shift lever housing up far enough to compress wave

washer. Install bearing support by aligning "V" in support with "V" in jacket. Install and tighten screws. **NOTE** — With telescope columns, install actuator rod before tightening support screws. Install lower bearing adapter, bearing, bearing reinforcement, jacket and adapter. Install centering spheres and anti-lash spring. With telescope columns, install upper shaft, locking wedge, locking rod and bumper in upper yoke. Install steering shaft assembly in shift tube from upper end carefully guiding shaft through tube and bearing. With tilt only columns, install actuator rod through shift lever housing and insert in slot in bearing support.

4) If bearing housing was disassembled, proceed as follows: Press bearings into housing. Install lock shoe springs, lock shoes and shoe pin in housing. **NOTE** — With tilt lever opening on left side, shoes facing up, the four slot shoe is on left. Use a .180" rod to line up shoes for pin installation. Install shoe release lever, spring and pin. **NOTE** — To reduce load on release lever, hold shoes inward and wedge a block between top of shoes and bearing housing. Install sector drive shaft and lightly tap sector onto shaft and install snap ring. Install lock bolt and engage with sector cam surface. Install rack and spring. Block tooth on rack should engage same on sector. Install external tilt release lever. Install lock bolt spring and tighten screw.

5) Extend rack downward from housing and assemble housing over steering shaft. Engage rack over end of actuator rod. With tilt release lever, hold lock shoes in the disengaged position and position housing over shaft so pivot pin holes line up. Install pivot pins using a brass drift. Place housing in full up position and install tilt spring guide, spring and retainer. Install upper bearing inner race and race seat. Install tilt and turn signal lever opening shields as equipped. Remove tilt release lever and install turn signal housing. Install tilt release lever and shift lever

6) Install 3 screws securing cover to housing assembly. Position wedge spring on buzzer switch, push switch and spring into hole in housing with switch contacts pointing up. Position turn signal switch in neutral position and install 3 screws.

7) Install hazard warning flasher button and check operation. Assemble ignition switch on actuator rod and adjust. Align key cylinder lock with keyway in housing and push lock all the way in. Install retaining screw and tighten. To complete reassembly, reverse disassembly procedure.

NOTE — All friction parts EXCEPT ignition lock assembly are to be lubricated with a light coat of lithium grease.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N·m)
Steering Wheel Nut	
American Motors	25 (34)
Chrysler Corp.	45 (61)
General Motors	30 (41)
Bracket-to-Column Nuts	15-25 (20-34)
Bracket-to-Instrument Panel Stud Nuts	⓪15-25 (20-34)
Flexible Coupling Nuts	20 (27)
Flexible Coupling-to-Shaft Bolt	30 (41)

⓪ — Do not exceed 25 ft. lbs. to prevent crushing capsules.