

INTERNATIONAL HARVESTER

**150 & 200
1310 & 1510MHC**
Scout II, Terra & Traveler

NOTE — Information on MS1210 was not available from manufacturer at time of publication.

DESCRIPTION

All the steering columns used on International Harvester vehicles have energy absorbing safety features and column locking devices. On the motor home chassis, a tilt-wheel device is standard.

REMOVAL & INSTALLATION

150 & 200 MODELS

Removal & Installation — 1) Remove nut and bolt from pot coupling clamp and slide pot coupling off upper steering shaft. Disconnect shift linkage from shift lever.

2) Remove six clamp nuts and bolts securing column to dash panel. Remove clamp brackets. Note location of two bolts and nuts. Remove seal. Remove bolts securing steering column to brake pedal mounting bracket. Disconnect electrical wiring. Carefully withdraw steering column assembly from chassis. To install, reverse removal procedure.

SCOUT II, TERRA & TRAVELER

Removal — 1) Remove bolt and lock washer securing universal joint to steering shaft. Remove six clamp bolts securing column to dash panel. Remove clamp brackets. Note location of two bolts and nuts.

2) Remove bolts securing steering column to brake mounting bracket. Disconnect electrical wiring. Carefully withdraw steering column assembly from chassis. Remove rubber boot from column.

Installation — 1) Slide rubber boot over steering shaft clamp and onto jacket tube. Carefully position steering column assembly in chassis. Connect electrical wiring. With steering wheel and front wheels in straight-ahead position, insert steering shaft splines into universal joint. Install bolt and lock washer and tighten.

2) Secure upper end of column to brake pedal mounting bracket, tightening bolts finger tight. Position rubber boot and secure column lower end to dash panel with upper and lower clamps. Install four capscrews finger tight, securing clamp brackets to dash panel. Install two bolts, nuts and lock washers securing upper and lower clamp brackets. Tighten bolts.

3) Tighten two upper column mounting bolts to brake pedal mounting bracket. Tighten four capscrews at lower column in following sequence: bottom two first, top two last. Check that there is no binding throughout steering gear range of travel.

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Removal & Installation — To disconnect steering column lower end, remove pinch bolt securing steering shaft flange to steering shaft. Refer to body manufacturer's instructions for removal and installation procedures at column upper end.

OVERHAUL

150, 200, SCOUT II, TERRA & TRAVELER

Disassembly (Auto. Trans. Only) — 1) Remove horn button and spring. Disconnect horn wiring. Remove steering wheel nut, then, using wheel puller, remove wheel. Remove three cover screws and lift cover off shaft. Depress lock plate downward as far as possible using suitable tool (SE-2500). Pry retaining ring out of shaft groove and remove retaining ring and lock plate.

2) Slide upper bearing preload spring and directional signal canceling cam off upper steering shaft. Slide thrust washer off upper steering shaft. Remove directional signal lever screw and lever. Remove three switch mounting screws. Remove four mounting bracket screws and bracket from jacket. Pull connector out of bracket on jacket. Remove protector from jacket and strip wire from it.

3) Pull switch straight up, being careful not to snag signal wire connector in housing. Position lock cylinder in "RUN" position. Insert a thin tool into slot next to switch mounting screw boss and depress retainer at bottom of slot which releases lock. Remove lock. Turn ignition to "OFF UNLOCKED" position and remove two attaching screws and switch. Drive out shift lever pivot pin and remove shift lever.

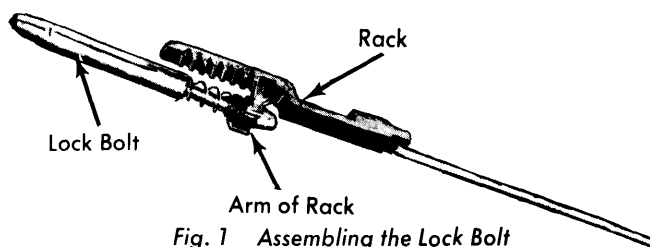
4) Remove four screws attaching upper housing to jacket. Remove upper housing assembly. Remove thrust cup, rack and lock bolt, rack preload spring, and shift gate. Remove sector through lock cylinder hole by pushing firmly on block tooth of sector with blunt punch. Remove shift bowl and shroud from jacket. Remove lower bowl bearing from top of jacket.

5) Pull steering shaft assembly from bottom of column. Remove two screws holding neutral-start switch and remove switch. Remove bearing adapter clip. Remove bearing retainer, bearing adapter, and shift tube spring. Slide out shift tube assembly.

Reassembly (Auto. Trans. Only) — 1) Apply a thin coat of lithium soap grease to all friction surfaces. Press lower bearing assembly into adapter assembly. Insert shift tube assembly into lower end of jacket and rotate until upper shift tube key slides into bowl keyway. Assemble spring adapter assembly and retainer into bottom of jacket. Holding adapter in place, insert snap ring into jacket and mating retainer slots.

2) Install neutral-start switch, making sure that proper screws are used. Screws that are too long will destroy collapsible feature of column. Slide steering shaft assembly into column. Install sector in lock cylinder hole over sector shaft with tang end to outside of hole. Press sector over pin with blunt tool.

3) Install shift gate onto housing. Insert rack preload spring in housing from bottom side. Assemble bolt to crossover arm of rack. Insert rack and lock bolt into housing from bottom with teeth up (toward steering wheel) and toward centerline of column.



Steering Columns

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4) Install thrust cup on bottom hub of housing. Install lower bowl bearing in jacket. Install bowl and rotate it to be sure it is seated in bearing. With bowl in place, install upper bearing housing assembly on jacket. Bowl should be in "PARK" position and rack pulled downward. Be sure housing is seated on jacket and install screws.

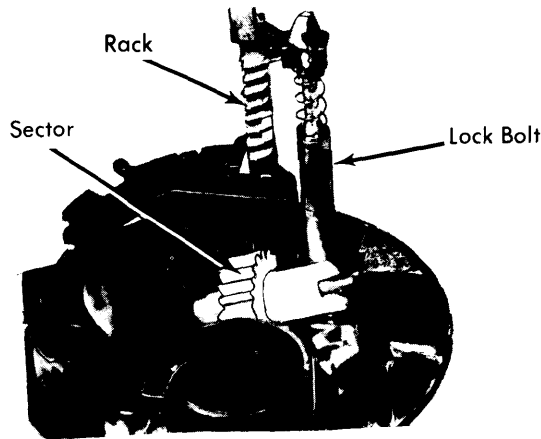


Fig. 2 Installing the Rack and Lock Bolt

5) Replace turn signal switch. Feed connector down through housing. Assemble wires into protector, then install protector onto jacket. Hold bracket in place and drive four screws. Clip connector into bracket on jacket. 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 into abutment of cylinder and sector. Rotate knob counterclockwise, maintaining a light push inward on cylinder, until drive section of cylinder mates with sector. Push in until retainer pops into grooves and lock cylinder is secured in housing. Check freedom of rotation.

6) When replacing ignition switch, place shift bowl in any position except "PARK" and rotate lock counterclockwise until rack bottoms against lower surface of cast in bowl plate. Place ignition switch in "OFF-UNLOCKED" position by following procedure: Move slider on switch to extreme left ("ACCESSORY" position). Now move slider two positions to right from "ACCESSORY" to "OFF-UNLOCK" position. Fit actuator rod into slider hole and assemble to column with two screws.

7) Assemble washer, spring and canceling cam on shaft, making certain that directional signal switch is in center position and hazard warning button is out. Assemble lock plate on shaft, depress these parts, and install a new retaining ring in groove on shaft. Switch assembly may be damaged if above procedure is not followed. Place cover on shaft lock and drive screws. Assemble steering wheel and levers. Be sure bowl is in "DRIVE" when inserting shift lever.

Disassembly (Man. Trans. Only) — 1 Remove steering wheel using standard wheel puller. Remove three cover screws and lift cover off shaft. Depress lock plate downward as far as possible using suitable tool (SE-2500). Pry retaining ring out of shaft groove. Remove retaining ring and lock plate. Slide upper bearing preload spring and directional canceling cam off upper steering shaft.

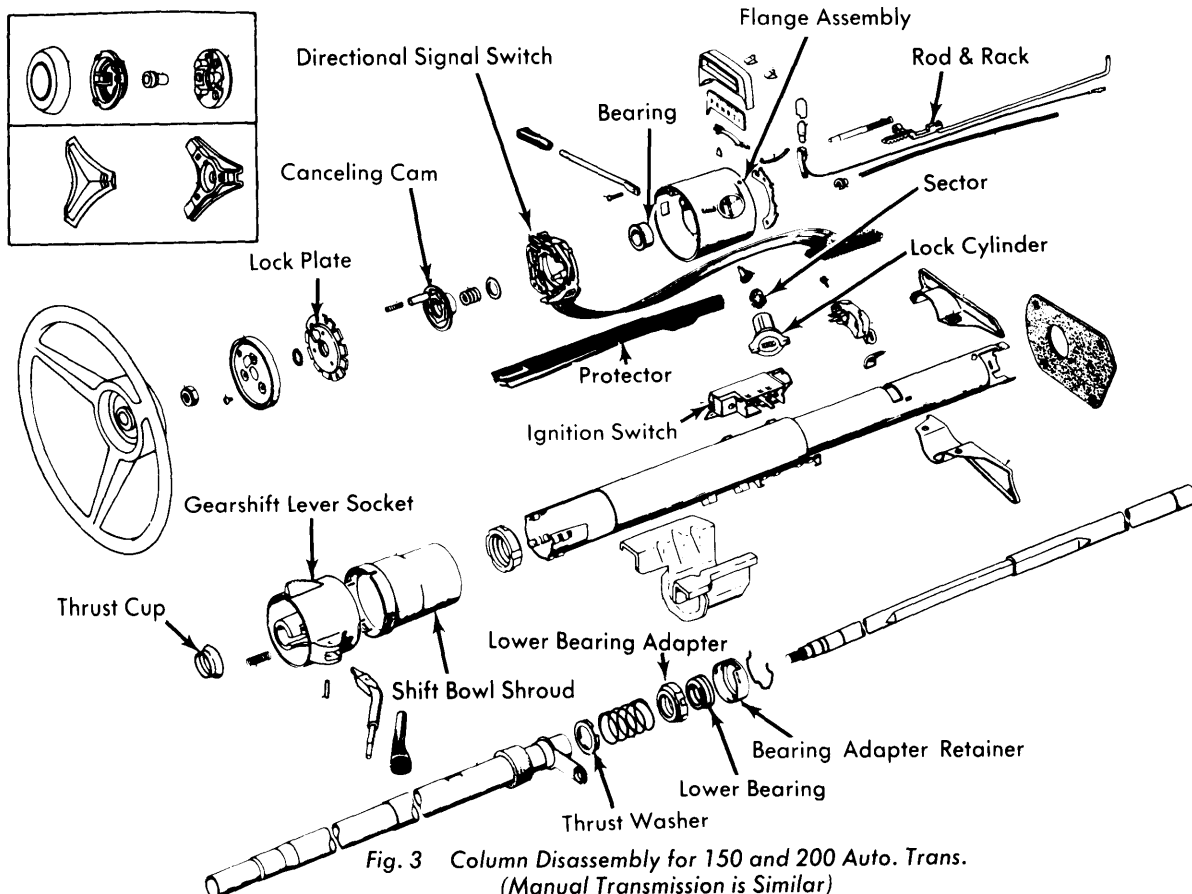


Fig. 3 Column Disassembly for 150 and 200 Auto. Trans. (Manual Transmission is Similar)

INTERNATIONAL HARVESTER (Cont.)

2) Slide thrust washer off upper steering shaft. Remove directional signal lever and screw. Push hazard warning knob in and unscrew. Remove three switch mounting screws. Remove four mounting bracket screws and bracket from jacket. Pull connector out of bracket on jacket. Remove protector from jacket and strip wires from it. Pull switch straight up with wire protector.

3) Insert a thin tool into slot next to switch mounting screw boss and depress retainer at bottom of slot which releases lock. Remove lock. Place ignition switch in "OFF-UNLOCKED" position and remove. Drive out shift lever pivot pin and remove lever. Remove four screws attaching upper housing to jacket. Remove upper housing assembly. Remove thrust cup.

4) Remove rack and lock bolt. Remove rack preload spring. Remove shift gate. Remove sector through lock cylinder hole. Remove shift bowl and shroud from jacket. Remove lower bowl bearing from top of jacket. Remove steering shaft assembly from bottom of column. Remove two screws holding back-up switch and remove switch.

5) Remove bearing adapter clip. Remove bearing retainer, bearing adapter, bearing, and 1st-Reverse shift lever. Remove three screws from bearing at lower end. Slide out shift tube assembly.

Reassembly (Man. Trans. Only) - 1) Apply a thin coat of lithium soap grease to all friction surfaces. Press lower bearing assembly into adapter assembly. Insert shift tube assembly into lower end of jacket and rotate until upper shift tube key slides into bowl keyway.

2) Assemble 1st-Reverse lever and adapter assembly into bottom of jacket. Holding adapter in place, insert snap ring in jacket slots. Place a .005" shim between 1st-Reverse lever and lever spacer and turn upper shift bearing down and tighten three screws. Remove shim. Install back-up switch and slide shaft assembly into column.

3) Install sector in lock cylinder hole over sector shaft with tang end to outside of hole. Press sector over pin with a blunt tool. Install shift gate to housing. Insert rack spring in housing from bottom side. Assemble bolt to crossover arm of rack. Insert rack and lock bolt into housing from bottom with teeth up (toward steering wheel) and toward centerline of column.

4) Install thrust cup on bottom hub of housing. Install lower bowl bearing in jacket and place wave washer in bowl bearing. Install bowl and rotate it to be sure it is seated in bearing. With bowl in place, install upper bearing housing assembly on jacket. Bowl should be in "REVERSE" position and rack pulled downward. Install screws.

5) Install directional signal switch. Feed connector down through housing. Assemble wires into protector and assemble protector to column. Hold bracket in place and install four screws. Clip connector into bracket on jacket. 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, maintaining a light push inward on cylinder, until drive section of cylinder mates with sector. Push in until retainer pops into grooves and lock cylinder is secured in housing. Check freedom of rotation.

6) To replace ignition switch, place shift bowl in any position except "REVERSE" and rotate lock counterclockwise until rack bottoms against lower surface of cast in bowl. Place ignition switch in "OFF-UNLOCKED" position, then fit actuator rod into slider hole and assemble to column.

7) Assemble washer, spring and canceling cam on shaft, making certain that turn signal switch is in "NEUTRAL" position and hazard warning plunger is out. Assemble lock plate on shaft, depress these parts and install a new retaining ring in groove on shaft. Place cover on shaft lock and install screws. Assemble steering wheel and levers.

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Disassembly - 1) Place column in vise using suitable holding fixture. Remove directional signal switch. Remove lower steering shaft and pot joint assembly. Remove lower bearing and adapter assembly from column, then press bearing out from adapter. If column shift model, remove shift lever pivot pin and shift lever.

2) Install tilt release lever and place column in full up position. Remove tilt lever spring and retainer using a screwdriver that just fits into slot opening. Insert screwdriver into slot, push in approximately $\frac{3}{16}$ ", then rotate clockwise approximately $\frac{1}{8}$ " turn until retainer ears align with grooves in housing, then remove retainer and spring.

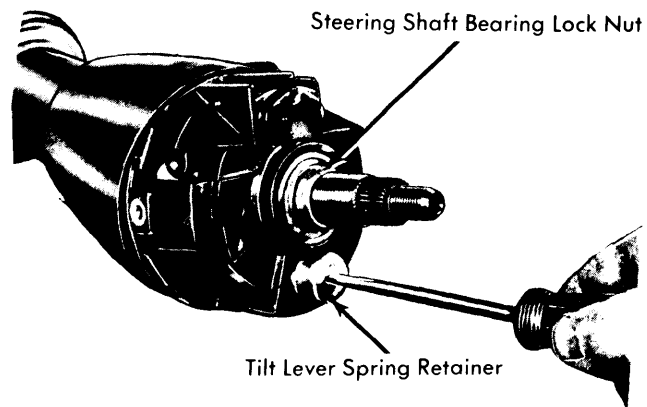


Fig. 4 Removing Tilt Spring and Retainer

3) Remove steering shaft bearing lock nut using suitable socket. Remove upper bearing race seat and race. Remove two bearing housing pivot pins using suitable tool (SE-2408).

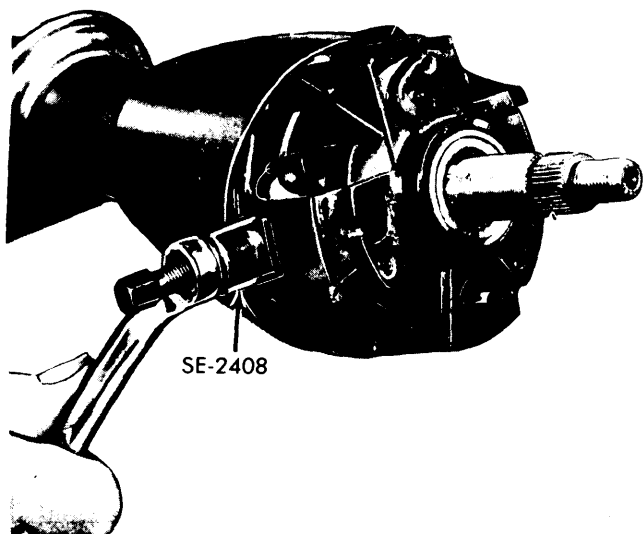


Fig. 5 Removing Bearing Housing Pivot Pin

Steering Columns

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4) Pull up on tilt release lever (to disengage lock shoes) and remove bearing housing. If it is necessary to disassemble bearing housing, proceed as follows: Press upper and lower bearings out of housing. Using suitable puller and slide hammer, pull bearing races from housing. Remove tilt release lever. Drive out shoe release lever pivot pin using a punch. Remove lever spring and remove wedge. Drive out lock shoe retaining pin with a punch and remove shoes and shoe springs.

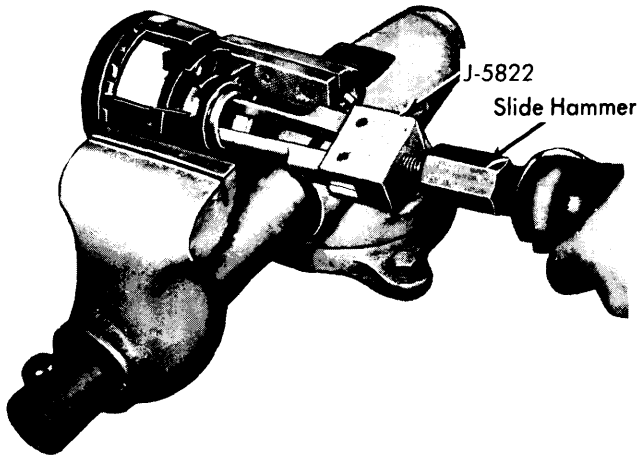


Fig. 6 Removing Bearing Race

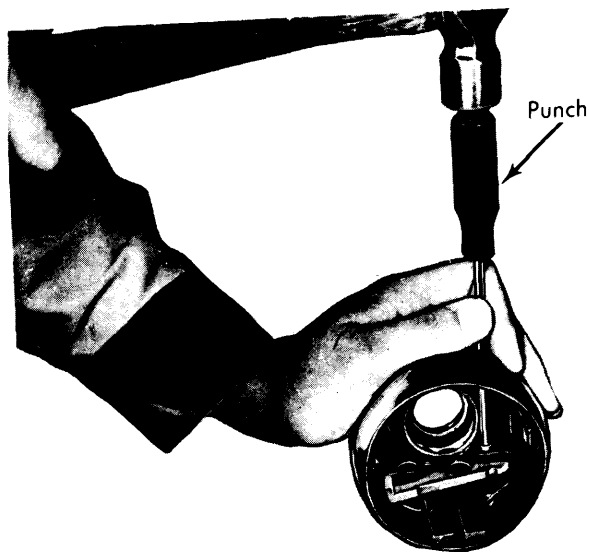


Fig. 7 Removing Release Lever Pivot Pin

5) Remove steering shaft assembly through upper end of column. If it is necessary to disassemble shaft assembly, proceed as follows: Turn upper shaft 90° to lower shaft and slide upper shaft and centering spheres from lower shaft. Rotate centering spheres 90° and remove centering spheres and preload spring from upper shaft.

6) Remove four bearing housing support screws and remove support. If shift tube index plate (column shift only) must be removed, remove two retaining screws and remove plate. Remove shift tube retaining ring with screwdriver. Remove thrust washer. Remove neutral start switch or back-up lamp switch retaining screws and remove switch.

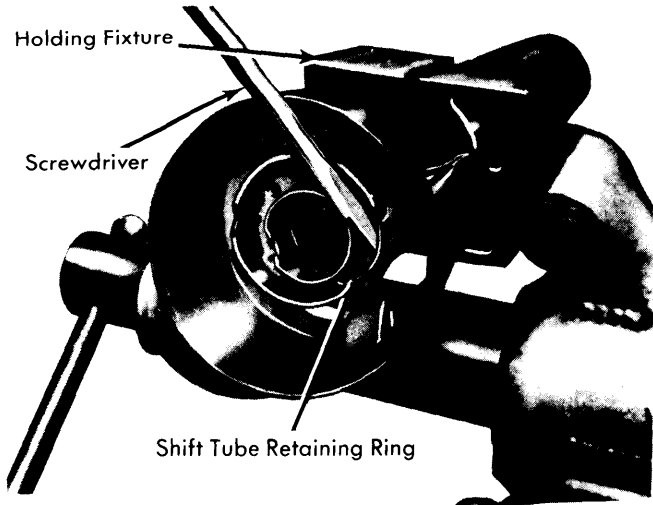


Fig. 8 Removing Shift Tube Retaining Ring

7) Remove shift tube assembly using suitable tool (SE-2409). Insert hooked end of tool into notch in shift tube just below shift lever housing key. Pilot the sleeve over threaded end of tool and into upper end of shift tube. Force shift tube out of housing by turning nut onto the tool. If shift tube is not completely free when nut is bottomed on its threads, complete removal by hand. **CAUTION** — Do not hammer on shift tube during removal. On column shift models, guide lower shift lever through slotted opening in column to prevent damage to tube or column.

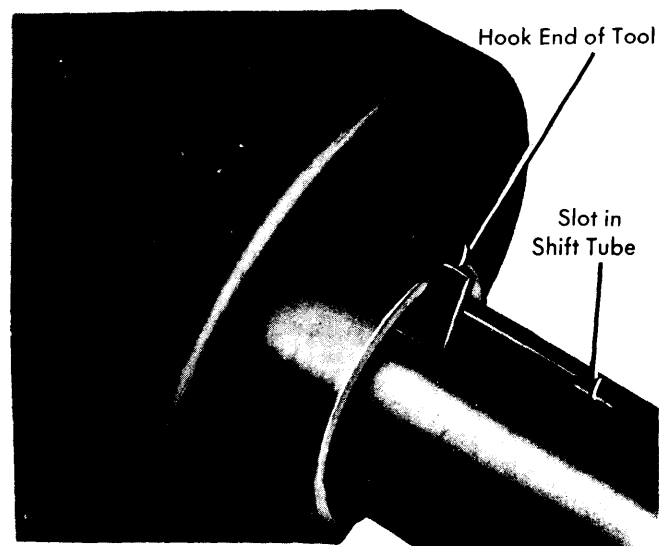


Fig. 9 Removing Shift Tube Assembly

8) Remove lock plate by sliding out of column notches, tipping plate downward toward housing (to compress wave washer), then removing as shown in illustration. Remove wave washer. On column shift models, remove shift lever housing and shift lever spring. Remove dash panel seal, mounting plate, and instrument panel seal from column jacket.

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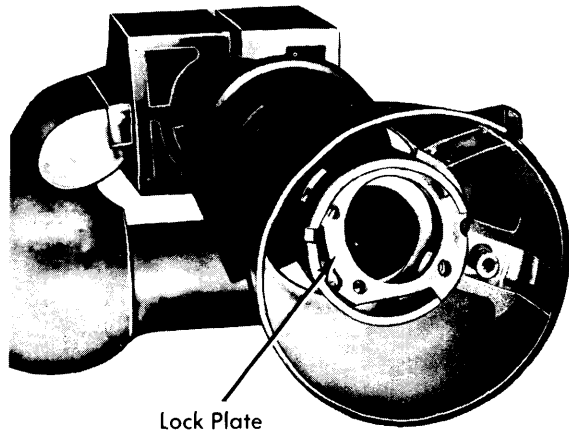


Fig. 10 Removing the Lock Plate

Reassembly - 1) When lubrication is called for, use lithium soap grease. Install dash panel seal, mounting plate and instrument panel seal on column. On column shift models, press a new shift lever spring into shift lever housing. Slide shift lever housing over upper end of column. Place wave washer and lock plate in position. Work lock plate into notches by tipping plate toward housing (compressing wave washer) at open side of column. Lubricate lock plate and upper end of shift tube.

2) Carefully install shift tube into lower end of column (make sure foam seal is at lower end of shift tube). Align keyway in tube with key in shift lever housing and complete installation of shift tube using suitable installer tool. Shift lever housing key must bottom in shift tube slot to be fully installed. Remove installer tool from column. Lubricate and push foam seal in flush with column housing. **CAUTION** - Do not hammer or force tube when installing in column.

3) Pull up on shift lever housing (to compress wave washer) and install thrust washer and retaining ring. Be sure ring is seated in both slots of shift tube. Lubricate inside diameter of bearing housing support and install support, aligning bolt holes in support with bolt holes in lock plate. Install four support screws and tighten.

4) Assemble steering shaft as follows: Lubricate and assemble centering spheres and preload spring. Install spheres into upper (short) shaft and rotate 90°. Install lower 90° to upper shaft and over centering spheres. Slowly straighten shafts while compressing preload spring.

5) Install shaft assembly into housing from upper end. Install lower bearing and adapter, bearing reinforcement, wire clip, pot joint coupling and lower shaft as follows: Press new bearing into adapter and install lower bearing and adapter onto lower end of steering shaft. Place in position in lower end of column, aligning wide tab of adapter with open slot in column.

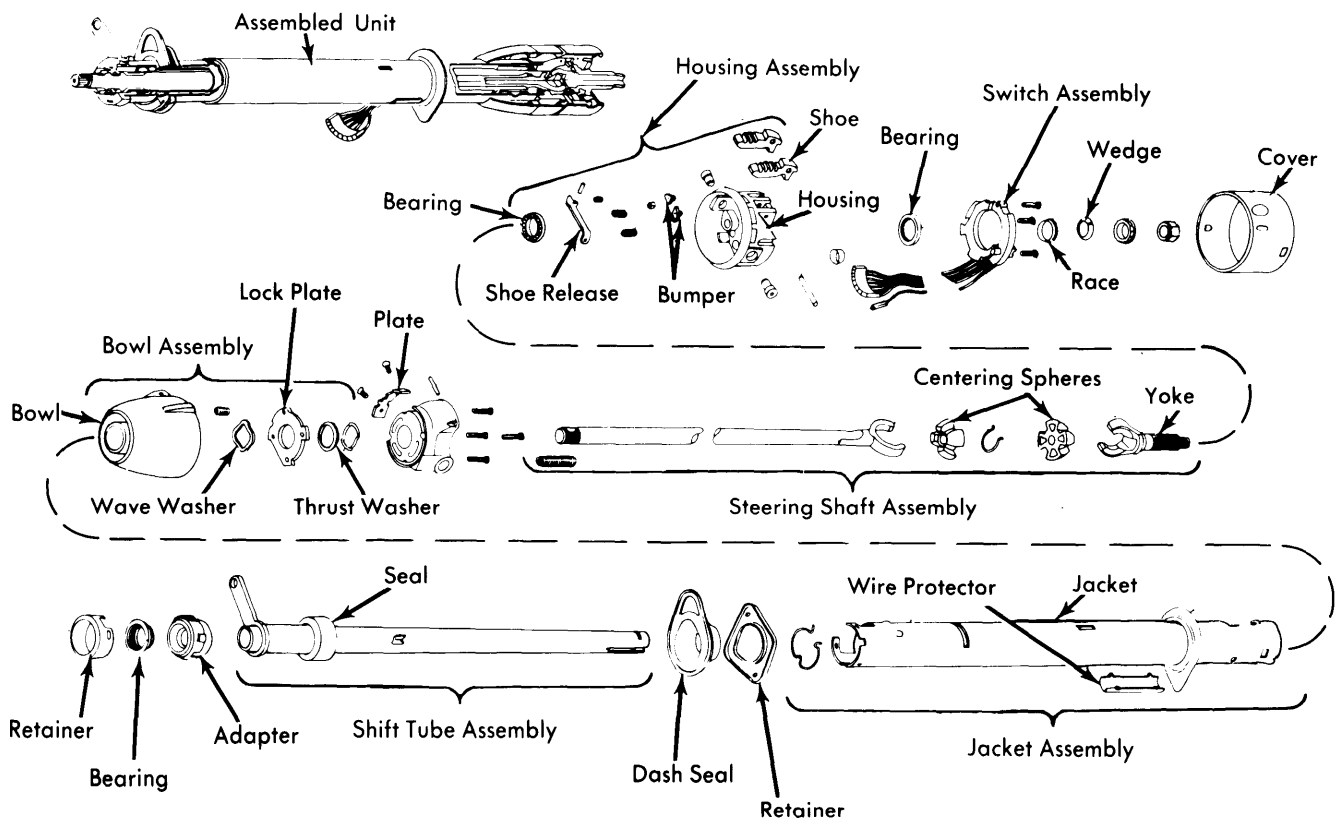


Fig. 11 Disassembled View of Tilt Wheel Steering Column Assembly

Steering Columns

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Place lower bearing reinforcement over end of column (open position of reinforcement to open slot in column) and install clip. Make sure all three tabs of clip are fully engaged with slots in reinforcement and column.

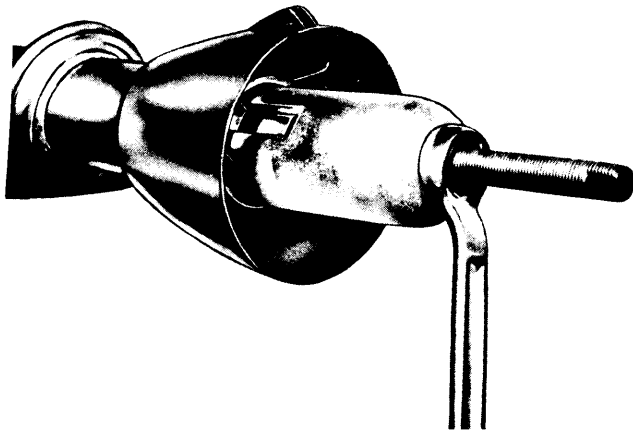


Fig. 12 Installing the Shift Tube

6) Assemble bearing housing as follows: Press new upper and lower bearing races into bearing housing. Lubricate and install bearings into races. Place lock shoe springs in position in housing. Install each shoe in place and compress spring until a suitable size straight punch can be used to hold shoes in position. Once shoes are in place, install retaining pin. Install shoe release lever and drive in pivot pin. Install tilt release lever. Lubricate shoes and release lever.

7) Install bearing housing assembly to support. Hold tilt release lever up until shoes have fully engaged support. Lubricate and install bearing housing pivot pins. Press pins in flush with housing. Place housing in full "UP" position and then install tilt spring and retainer (tapered end of spring first). Push into housing approximately $\frac{3}{16}$ " and rotate counterclockwise $\frac{1}{8}$ turn.

8) Lubricate and install upper bearing upper race, race seat and lock nut. Tighten lock nut to remove lash and then further tighten $\frac{1}{6}$ to $\frac{1}{8}$ turn (column must be in straight-ahead position). Remove tilt release lever.

9) Install directional signal switch. Install shift lever and pivot pin if column shift model. Install neutral-start or back-up lamp switch. Remove column from vise.

TIGHTENING SPECIFICATIONS

NOTE — Tightening specifications for 1310 & 1510MHC were not available at time of publication.

Application	Ft. Lbs.
150 & 200	
Fabric Coupling-to-Steering Gear Pinch Bolt	30
Fabric Coupling Nuts	20
Lower Joint Clamp Bolts	
$\frac{3}{16}$ " Diameter Shaft	30
$\frac{3}{4}$ " Diameter Shaft	50
Scout II, Terra & Traveler	
Steering Column-to-Mounting Bracket	35-45
Column Bracket-to-Pedal Bracket	20
Column-to-Dash Mounting Clamp	6-8
Pot Coupling-to-Steering Gear	35-45
Application	INCH Lbs.
150 & 200	
Shift Gate Mounting Screws	45
Housing Screws	60
Directional Signal Switch Mounting Screws	25
Ignition Switch Mounting Screw	35
Steering Shaft Lock Cover Screw	15
Neutral Start Switch Mounting Screws	15
Hazard Warning Switch Knob	5
Scout II, Terra & Traveler	
Ignition Switch Mounting Bolt	30-40
Directional Signal Switch Mounting Screw	30-40
Directional Signal Switch Housing	
Mounting Bolt	70-80