FORD NON-INTEGRAL BENDIX LINKAGE

Comet
Granada
Maverick
Monarch

DESCRIPTION

The Bendix Linkage non-integral power steering system is a hydraulically controlled linkage type steering system consisting of power cylinder, control valve, fluid lines, steering gear and pump.

OPERATION

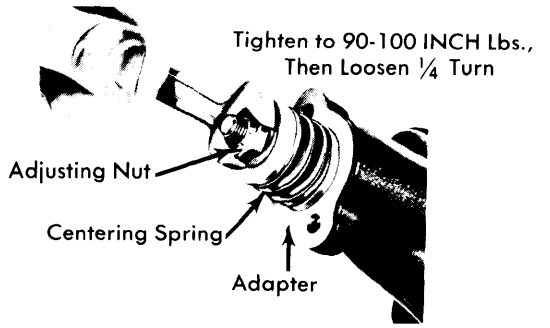
The hydraulic pump is belt driven from engine crankshaft. Fluid from pump reservoir is pressurized within pump according to operating requirements and maximum pressure is controlled by pump pressure relief valve. After fluid has passed from pump to control valve and power cylinder, it returns to the reservoir.

ADJUSTMENT

CAUTION — If a 2 post hoist is used to raise vehicle, place adapters under front suspension lower arms. Do not allow adapters to contact steering linkage.

CONTROL VALVE CENTERING SPRING ADJUSTMENT

Raise vehicle and remove spring cap attaching screws and lock washers, then remove spring cap. Tighten adjusting nut snug (90-100 INCH lbs.), then loosen nut ¼ turn. *NOTE — Make sure nut rotates ¼ turn (90°) on the threads of the bolt. Do not overtighten adjusting nut.* Position spring cap to valve housing, install attaching screws and washers, and tighten. Lower vehicle.



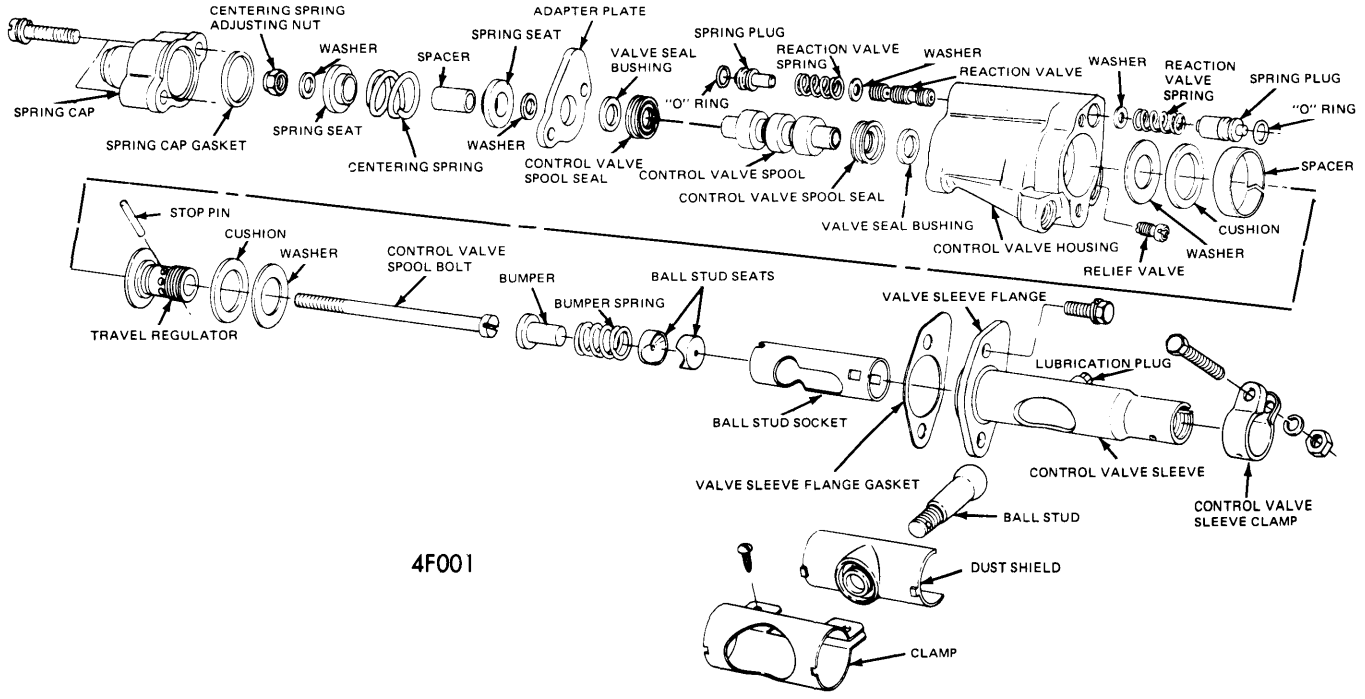
ADJUSTING CENTERING SPRING

REMOVAL & INSTALLATION

POWER STEERING CONTROL VALVE

Removal – Disconnect 4 fluid line fittings at control valve, drain fluid from lines. Turn wheels to left and right several times to force all fluid from system. Loosen clamping nut and bolt at right end of sleeve. Remove roll pin from steering arm-to-idler arm rod through the slot in the sleeve. Remove control valve ball stud nut. Using a suitable tool, remove the ball stud from sector shaft arm. After turning front wheels fully to left, unthread control valve from center link steering arm-to-idler arm rod.

Installation – Thread valve onto center link until about four threads are still visible. Position ball stud in sector arm shaft. Measure distance between center of grease plug in sleeve and center of stud at inner end of left spindle connecting rod. Measured distance should be 5 7/8". If distance is not correct, disconnect ball stud from sector shaft arm and turn valve on center link to increase or decrease distance. Align hole in steering arm-to-idler arm rod with slot near end of valve sleeve. Install roll pin in the rod hole to lock the valve in position. Tighten valve sleeve clamp bolt. Install nut on ball stud. Connect fluid lines to control valve. *CAUTION – Do not overtighten.* Fill fluid reservoir to cross hatched area on dip stick.



BENDIX POWER STEERING CONTROL VALVE ASSEMBLY

FORD NON-INTEGRAL BENDIX LINKAGE (Cont.)

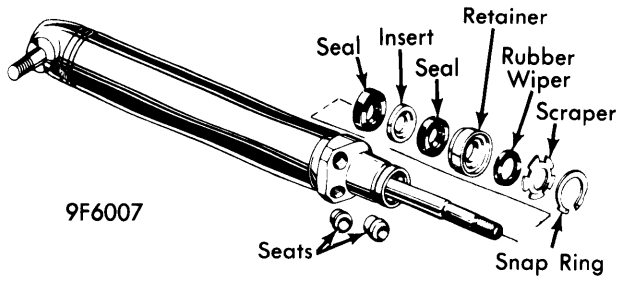
CONTROL VALVE INSTALLATION MEASUREMENT

NOTE – With engine running, check position of steering wheel (front wheels in straight ahead position). Do not make any adjustments until toe-in is checked. If either toe-in or steering wheel position is not correct, make all adjustments at spindle connecting rod sleeves.

POWER CYLINDER

Removal – Disconnect power cylinder fluid lines and allow to drain into a container. Remove nuts and insulator from end of cylinder rod. Remove cotter pin and nut securing cylinder to center link. Use a suitable steering linkage ball stud pressing tool (T64P-3590-F) to press cylinder stud from center link. *CAUTION – A ball stud pressing tool must be used or damage to power cylinder may result.* Remove insulator sleeve and washer from power cylinder rod end. Remove boot and discard clamp. Inspect tube fittings and seats in power cylinder for nicks, burrs or damage. Replace seats in cylinder or tubes as required.

Installation – Install cylinder rod boot with a new clamp. Install washer, sleeve, and insulator on end of power cylinder rod. Extend rod as far as possible. Insert rod in bracket on frame and compress rod as necessary to insert stud in center link. Secure stud with a castellated nut and cotter pin. Secure power cylinder rod with an insulator, washer, nut and pal nut. Connect fluid lines into correct ports and position lines so they are parallel to each other. Fill reservoir with suitable fluid (D2AZ-19582-A), start engine and turn wheels to right and left positions several times, then recheck fluid level in pump and add as required. Examine system for leaks during full turning loads.



POWER CYLINDER ASSEMBLY

CONTROL VALVE-TO-POWER CYLINDER HOSES

Removal – Raise vehicle and disconnect hoses from power cylinder and allow fluid to drain. Disconnect hoses from control valve and remove hoses.

Installation – Connect unmarked end of shorter hose to control valve. Connect other hose to control valve and hold hose so bend is parallel to surface of valve. Hold hoses from turning while tightening fittings as required. Connect opposite end of short hose to lower port in power cylinder and connect longer hose to upper port in cylinder. Ensure that hoses do not twist and remain parallel after tightening fittings. Fill pump reservoir with power steering fluid. Check system for correct operation and fluid leaks.

POWER STEERING PUMP-TO-CONTROL VALVE HOSES

Removal – Remove reservoir fluid and raise vehicle. Disconnect hoses at control valve and drain fluid. Lower vehicle and disconnect fluid hoses at pump. Remove bolts and clips attaching hoses, insulator, and retainer as an assembly.

Installation – Install both hoses in insulator and retainer. The paint stripe on pressure hose must align with slot on insulator. The paint or tape band on return hoses must center in insulator. Position the assembly at the original location and install attaching bolts. Place a hose clamp on return line and install on reservoir fitting. Connect pressure hose to outlet fitting and tighten as required. Raise vehicle and connect hose fittings to control valve, finger tight. Install clamp on hoses and tighten screw. Now tighten hose fittings as required. Fill pump reservoir with power steering fluid and check system for correct operation and fluid leaks.

POWER CYLINDER SEAL

Removal – Clamp cylinder in vise, remove snap ring from end of cylinder. *CAUTION – Do not clamp cylinder with excessive force.* Pull piston rod out to remove scraper, bushing and seals. If seals cannot be removed in this manner, remove them with an ice pick. *CAUTION – Avoid damage to shaft or seal.*

Installation – Coat new seals and shaft with a suitable lubricant. Push rod in cylinder and install parts in cylinder with a deep socket slightly smaller than the cylinder opening.

OVERHAUL

CONTROL VALVE

Disassembly – 1) Clean outside of valve before disassembly. *NOTE – Clamp valve in a soft jaw vise at sleeve flange to prevent damage.* Remove centering spring cap from valve housing.

2) Remove nut from end of valve spool bolt. Remove washers, spring seats, spacer, centering spring, adapter and bushing from bolt and valve housing. Remove bolts holding valve housing and sleeve together; separate housing from sleeve.

3) Push spool toward spring cap end of housing, remove seal and bushing, then push spool to sleeve end, forcing out spacer, cushion, and washer. Remove control valve spool. *NOTE – Observe direction spool is removed from valve housing as it must be reassembled in same direction.* Remove four hose seats from control valve housing. Remove return port (largest port) relief valve.

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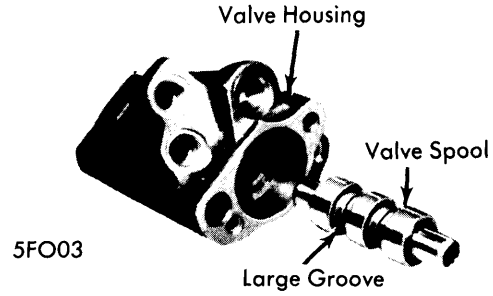
4) Remove spring plugs, "O" rings, washers, and springs from housing, then remove reaction limiting valve. Remove dust shield clamp screws, and dust shield.

5) Pull control valve spool bolt out as far as possible. Remove stop pin, then remove travel regulator and control valve spool. Remove ball stud, ball stud socket, bumper, bumper spring, and ball stud seats.

Tube Seat Replacement – If a hose seat is worn or damaged, it should be replaced. Insert a tapered drift into the seat opening and rock the drift by hand until the seat loosens and comes out. Place a new hose seat in the port and press it in with finger pressure making certain that the seat is centered. Install the hose fitting in the seat and tighten to specifications which will press the seat into place.

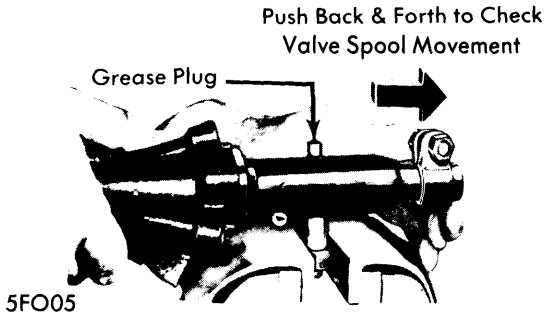
Reassembly – 1) Coat all parts, except seals with power steering lubricant; coat seals with suitable lubricant (COAZ-19553-A). Install reaction valve, two washers, two springs, and two spring plugs and "O" rings. Insert new hose seats. Insert one ball stud seat (flat and first) into ball stud socket, and insert into control valve sleeve as far as possible with threaded end toward outside. Insert ball stud through openings in valve sleeve and ball stud socket. Pull stud out and hold it on socket at ball stud opening. Insert remaining seat, round side in. Install bumper and bumper spring. Assemble regulator in ball stud socket using proper wrench on regular flats. Torque travel regulator to 5-10 ft. lbs. Then loosen regulator until nearest hole is aligned with slots, at least ½ hole but no more than 1½ holes. Insert pin and tilt ball stud toward housing end to remain in pin. Lay unit aside and continue to next step.



VALVE SPOOL INSTALLATION

2) Install spool seal, seal bushing, washer, spacer, and cushion into sleeve end of housing; and place on a flat surface. Carefully rotate spool into housing with groove nearest cap end (see illustration) until contact with spool seal is felt. Pick up housing and press on cushion at sleeve end while rotating spool through seal. Position spool so it just protrudes through seal bushing and install seal over spool at cap end. Place sleeve on a flat surface and use a screwdriver to work seal into housing. Install the seal bushing.

3) Install sleeve gasket and attach to housing, tighten sleeve bolts as required. Move ball stud to check freedom of movement. Assemble washer, spacer, adapter, spring seat, control valve centering spring, spring seat, washer, and the control valve spool bolt nut; tighten to 7.5-8 ft. lbs., then loosen nut with respect to spool bolt ¼ turn. The ball stud socket will turn first. The ¼ turn applies after stud hits sleeve window and spool bolt has turned to its stop.



CHECKING VALVE SPOOL MOVEMENT

4) While holding adapter plate to housing, move stud back and forth to check freedom of valve spool travel (see illustration). Install control valve spring cap and spring cap gasket on adapter plate and tighten screws as required. Install boot and clamp over stud. Ensure that boot garter spring is attached. Loosely install screws. Move stud sideways to determine center position and hold there. Place clamp against grease fitting and tighten screws. Remove grease plug and grease with .35-.55 ounces of suitable grease (ESA-M1C47A).

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Control Valve Sleeve Clamp Nut	13-17
Hoses-to-Control Valve	
Return Hose Fitting (⅝" Hex)	21-30
Pressure Hose Fitting (½" Hex)	15-21
Hoses-to-Power Cylinder	15-21
Hoses-to-Pump	
Female Fitting (13/16" Hex)	28-37
Male Fitting (⅝" Hex)	24-34
Control Valve Sleeve	12-18.7
Adapter Plate Screws	6-8
Cylinder Mounting Bracket	30-40
Power Cylinder-to-Bracket	18-24
Tie Rod-to-Spindle Arm	① 35-47
Idler Arm Mounting Bracket	30-40
Pitman Arm-to-Control Valve	① 35-47
Steering Gear-to-Frame	50-65
Pitman Arm-to-Sector Shaft	150-225

① – Torque to lower specification, then tighten to nearest cotter pin slot.