FORD MOTOR CO. RACK & PINION

Bobcat, Pinto
Capri, Mustang
Fairmont, Zephyr

DESCRIPTION

Steering is rack and pinion type, with input pinion shaft causing rack to move side to side when steering wheel is turned. Tie rods connect steering gear to the front suspension. Couplings that attach the tie rods to rack are pinned but can be removed for service. Bobcat and Pinto are filled with 7 ounces of lubricant oil. All other models require 5 ounces of liquid grease. Refilling is not required unless gear is disassembled or leakage is evident.

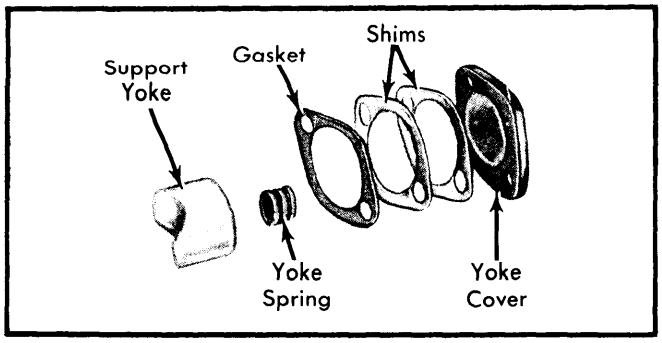

Fig. 1 Support Yoke & Rack Adjustment

ADJUSTMENT

Rack and pinion gear provides two means of service adjustment. Steering gear must be removed from vehicle to perform these adjustments.

SUPPORT YOKE-TO-RACK CLEARANCE

1) Clean exterior of steering gear thoroughly and mount gear in a soft-jawed vise or suitable holding fixture.

2) Remove yoke cover, gasket, shims and yoke spring *(see Fig. 1)*. Clean cover and housing flange areas thoroughly. Reinstall yoke and cover **without** gasket, spring, and shims. Tighten cover bolts lightly until cover just touches the yoke.

3) Measure gap between cover and housing flange, then select shims which, together with cover gasket, are .005-.006" thicker than the measured gap.

4) Remove cover, assemble gasket on housing flange, then install shim pack, spring and cover. Install and tighten bolts evenly. Check steering gear for binding or looseness and smooth operation.

PINION BEARING PRELOAD

1) Clean exterior of steering gear thoroughly and mount gear in a soft-jawed vise or suitable holding fixture.

2) Loosen yoke cover bolts to relieve spring pressure on rack. Remove pinion cover and clean cover flange area thoroughly, then remove cover gasket, spacer and shims.

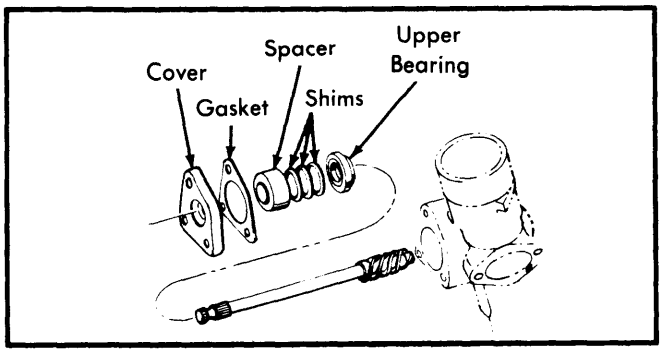

Fig. 2 Pinion Bearing Preload Adjustment

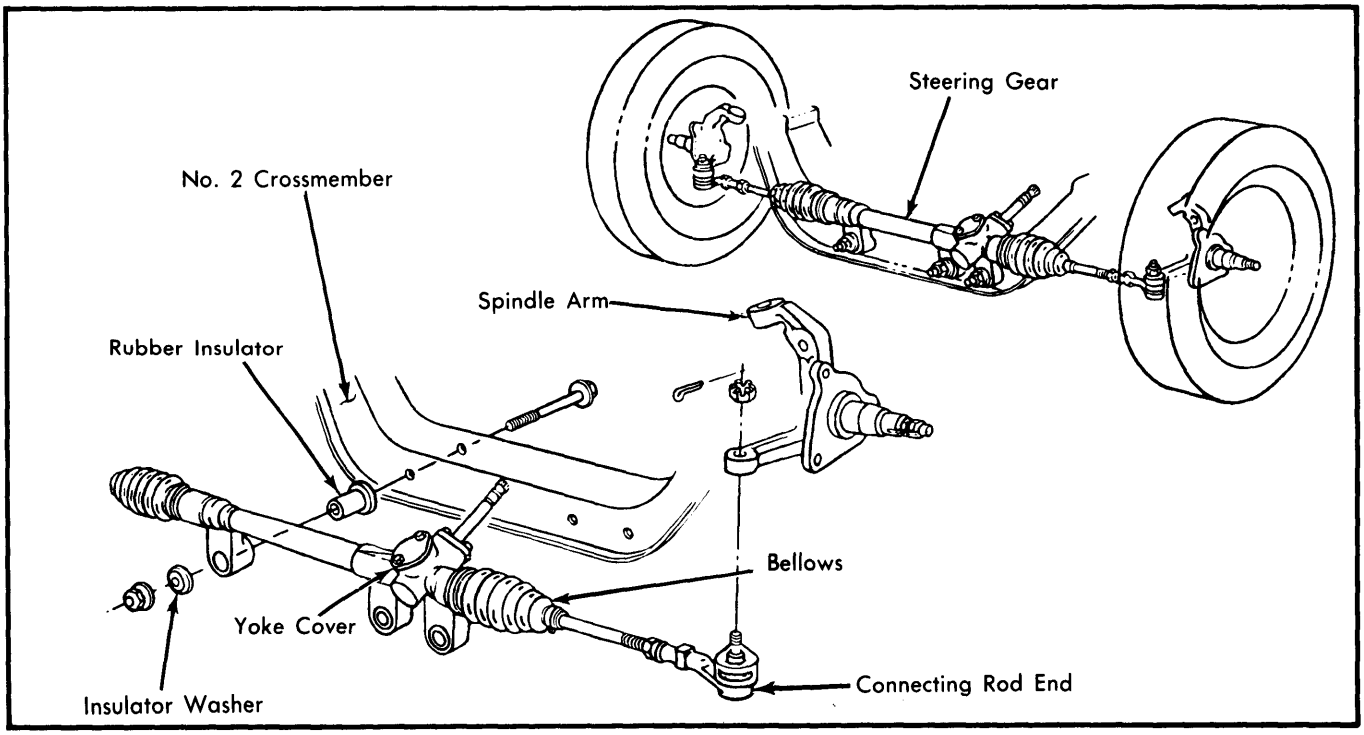

Fig. 3 Rack & Pinion Steering Linkage

FORD MOTOR CO. RACK & PINION (Cont.)

3) Install new gasket on pinion cover flange, fit shims between upper bearing and spacer until shim pack is flush with top surface of gasket (check with light pressure on straight-edge placed on gasket face), then add one .005" shim to preload bearings.

4) Install shims with thinnest shims inward. NOTE – *Spacer must be assembled next to housing cover.* Install cover and bolts then tighten evenly. Tighten yoke cover bolts evenly.

PERFORMANCE

With front suspension in good condition and steering gear properly adjusted, free play measured at steering wheel rim should be no more than 3/8". When turning steering wheel from one stop to the other with vehicle stationary, steering gear should not knock (a knock indicates that steering gear adjustment is required). NOTE – *Do not turn steering wheel forcefully from stop to stop with front wheels off ground. Build-up of pressure within gear could cause damage or blow off bellows.*

REMOVAL & INSTALLATION

Removal – Disconnect negative battery terminal, turn on ignition to unlock steering wheel and raise vehicle on hoist. Remove tie rod end retaining nuts and cotter pins. Using suitable separator tool (3290-C), disengage studs from spindle arms. Remove bolt holding pinion shaft to flexible coupling and bolts holding gear to crossmember. Remove gear assembly from vehicle.

Installation – Install gear assembly on chassis and install and tighten bolt holding pinion shaft to flexible coupling. Install and tighten gear to crossmember attaching bolts. Connect tie rod ends to spindle arms, install nuts and tighten; install cotter pins. Lower vehicle, turn off ignition switch, connect battery terminal. Check wheel alignment and reset if necessary.

OVERHAUL

TIE ROD ENDS, BALL JOINT SOCKETS & BELLOWS

Disassembly (Bobcat & Pinto) – 1) Clean exterior of gear, then mount in a suitable holding fixture. Loosen jam nuts on outer ends of tie rods adjacent to tie rod sockets, then remove sockets and jam nuts. Remove bellows clamps and bellows. Using suitable drill fixture (T74P-3504-AA), install drill stop on a 5/32" drill bit to bore a 3/8" deep hole. Tape cloth around both ends of ball socket to prevent metal chip contamination.

NOTE – *Tool No. T74P-3504-Z may be used to set drill stop depth.*

2) Install drill fixture on ball socket so that pin in ball socket is in line with guide hole in drill fixture. Cone points of alignment and locking screws must be positioned between lock nut and ball socket and tightened firmly. Place drill in fixture guide hole and drill out retaining pin. Remove tie rod and ball socket using suitable wrench (T74P-3504-CC). Remove lock nut, inner thrust bearing (seat) and rack spring from recess in end of rack. Inspect all parts, replace if damaged.

Reassembly – 1) Install new rack spring in end of rack. Assemble ball socket to tie rod, then install a new inner thrust bearing (seat) in ball socket. Apply suitable lubricant to all parts. Thread ball joint lock nut on end of rack, then thread ball socket onto rack until tie rod articulation becomes stiff. Rotate tie rod at least seven times, then install a ball joint on tie rod end.

2) Place hook of suitable pull scale (T74P-3504-Y), through hole in threaded area of ball joint. With tie rod parallel to rack, adjust position of ball socket on rack until effort required to move tie rod with pull scale is 4-6 lbs. Secure unit by tightening lock nut against ball socket. Install drill fixture on ball socket, then drill a hole on line of contact of lock nut and ball socket.

NOTE – *A new hole must be drilled even if the halves of the existing holes align. A total of only two drilled holes are allowed on one end of the rack. If further removal is necessary, then ball socket, lock nut and rack must be replaced.*

3) Insert retaining pin in drilled hole and tap flush with ball housing and lock nut surfaces. Stake metal of ball housing and lock nut over pin to secure tie rod adjustment. To test pinning operation, apply a reverse torque of 35 ft. lbs. on lock nut. Joint must not loosen. Thoroughly clean rack and housing bore to remove any foreign material. Remove tie rod ends and install bellows, bellows-to-housing clamps, and 7 ozs. of suitable lubricant. Install bellows-to-tie rod clamps, jam nuts and tie rod sockets.

Disassembly (Capri, Mustang, Fairmont & Zephyr) – 1) With exterior of gear clean and unit mounted in a suitable holding fixture, loosen jam nuts on outer ends of tie rod sockets. Remove tie rod ends and jam nuts.

2) Remove clamps and bellows and drain lubricant. Use care not to damage or contaminate inside of bellows. Remove spiral pin from ball housing *(Fig. 4)* using suitable tool (T78P-3504-N).

3) Install ball housing torque adapter (T78P-3504-AA) with point of locking screw in large hole midway along length of housing. Tighten screw and attach 1/2" handle to the tool.

4) Expose rack teeth sufficiently to install adjustable wrench over flat of teeth. Loosen housing by holding rack with adjustable wrench and turning ball housing adapter tool.

Assembly – 1) Reverse disassembly procedure after threads on rack and in ball housing jacket have been cleaned and inspected. Torque ball housing as specified and rotate tie rod at least 10 times before measuring effort required to move tie rod as in step 2) of Bobcat and Pinto procedure. Tie rod should move with 1-5 lbs. effort.

2) Insert spiral retaining pin into small hole in ball housing and seat by tapping lightly with a hammer. Do not deform pin by tapping too hard. Apply specified lubricant to tie rods where bellows will be clamped to keep bellows from twisting when toe-in is adjusted. Install small bellows clamps and large clamp to right end only.

FORD MOTOR CO. RACK & PINION (Cont.)

3) Place gear in vertical position with pinion end up. Fill with lubricant as specified and install large bellows clamp to secure bellows to gear housing. Install tie rod ends and jam nuts.

INPUT SHAFT SEAL

Removal & Installation – Thoroughly clean input shaft and seal area, then pry pinion seal from bore taking care not to damage shaft. Lubricate new seal with suitable lubricant, then install over shaft. Using a piece of tubing, press or tap seal into bore until flange is flush with shoulder of bore.

PINION ASSEMBLY, BEARINGS, RACK & HOUSING

Disassembly – Clean exterior of rack and pinion assembly and mount in suitable holding fixture. Remove yoke cover, shims, spring and yoke. Remove right hand ball housing/tie rod assembly and position rack to right hand stop. Note position of flat on input shaft (Bobcat and Pinto) or "D" shaped groove (Capri, Mustang, Fairmont and Zephyr).

NOTE – *Flat or "D" shaped groove must be in same position upon assembly so that steering wheel will be in straight ahead position.*

Reassembly – Install lower bearing in pocket at bottom of housing, then install rack. With rack positioned as in disassembly, install pinion shaft making sure end is engaged in lower bearing and flat or "D" is in same position as during removal. Install upper bearing, shims, spacer, gasket and pinion cover. Check bearing preload and adjust as necessary. Install ball housing/tie rod assembly, support yoke, spring, shims, gaskets and cover. Tighten all bolts, then adjust yoke-to-rack clearance.

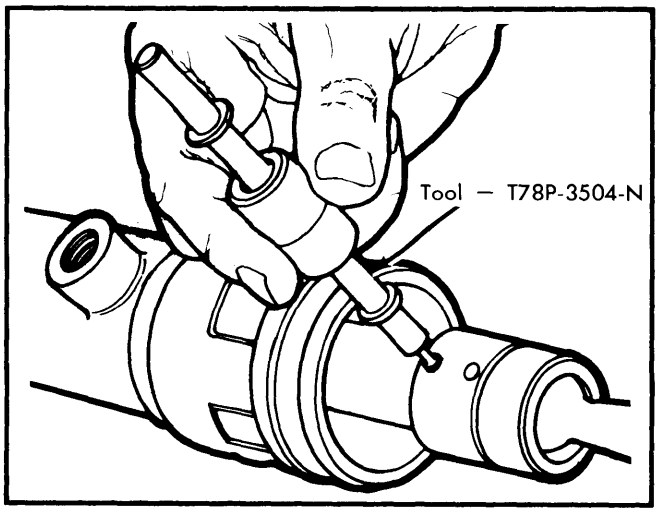

Fig. 4 Removing Spiral Pin (Capri, Fairmont, Mustang, Zephyr)

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Support Yoke Cover-to-Housing Bolts	15-20
Pinion Cover-to-Gear Housing Bolts	15-20
Steering Gear-to-Crossmember Bolts	80-100
Tie Rod End-to-Spindle Arm Nut	① 35-47
Tie Rod End-to-Inner Tie Rod	35-50
Pinion Shaft-to-Flex Coupling Bolts	20-37
Ball Housing to Rack	40-60

① – Tighten to nearest cotter pin slot after torquing to specification.