STEERING
MANUAL AND POWER

CONTENTS

5081 Pasadena Ave.
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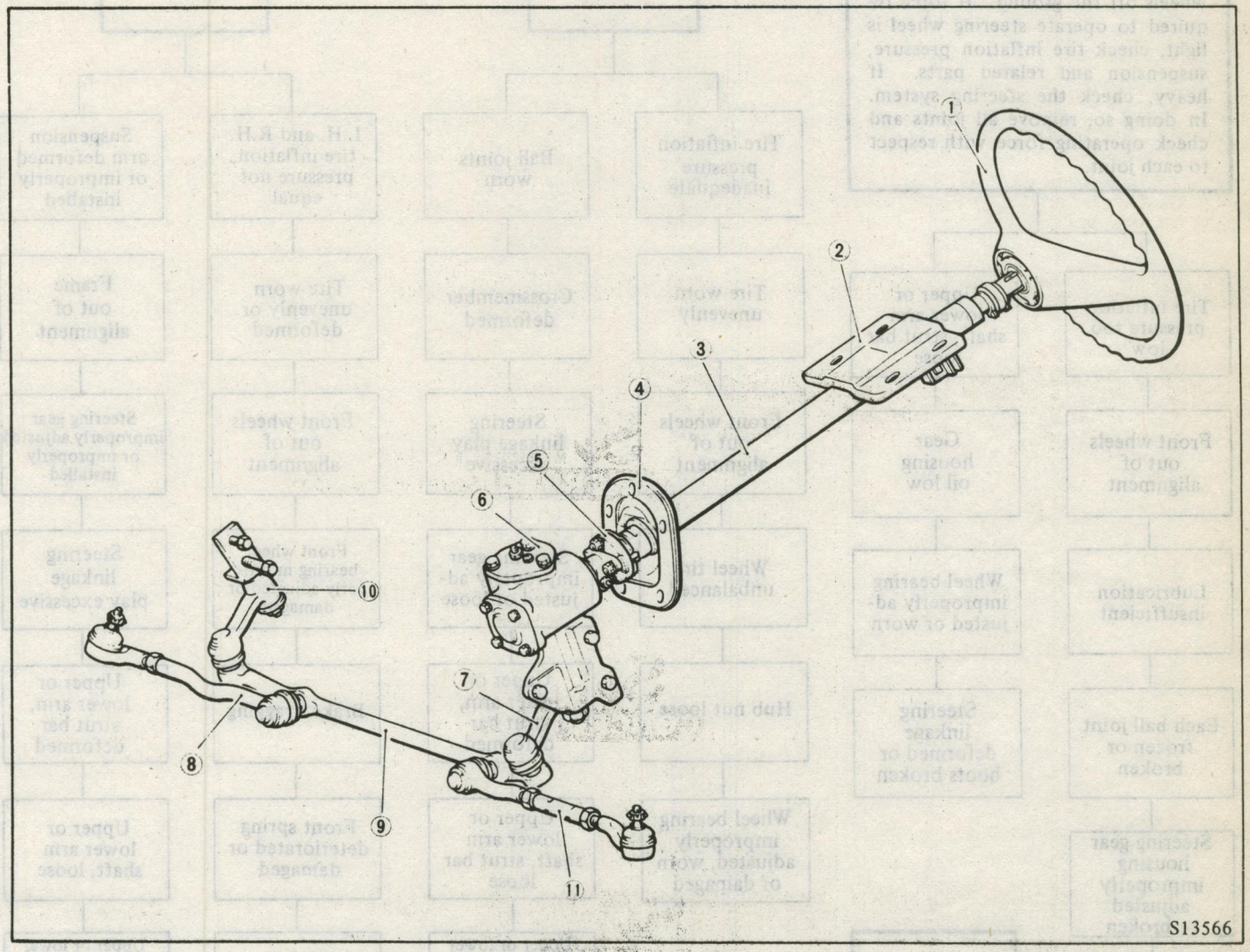
MANUAL STEERING

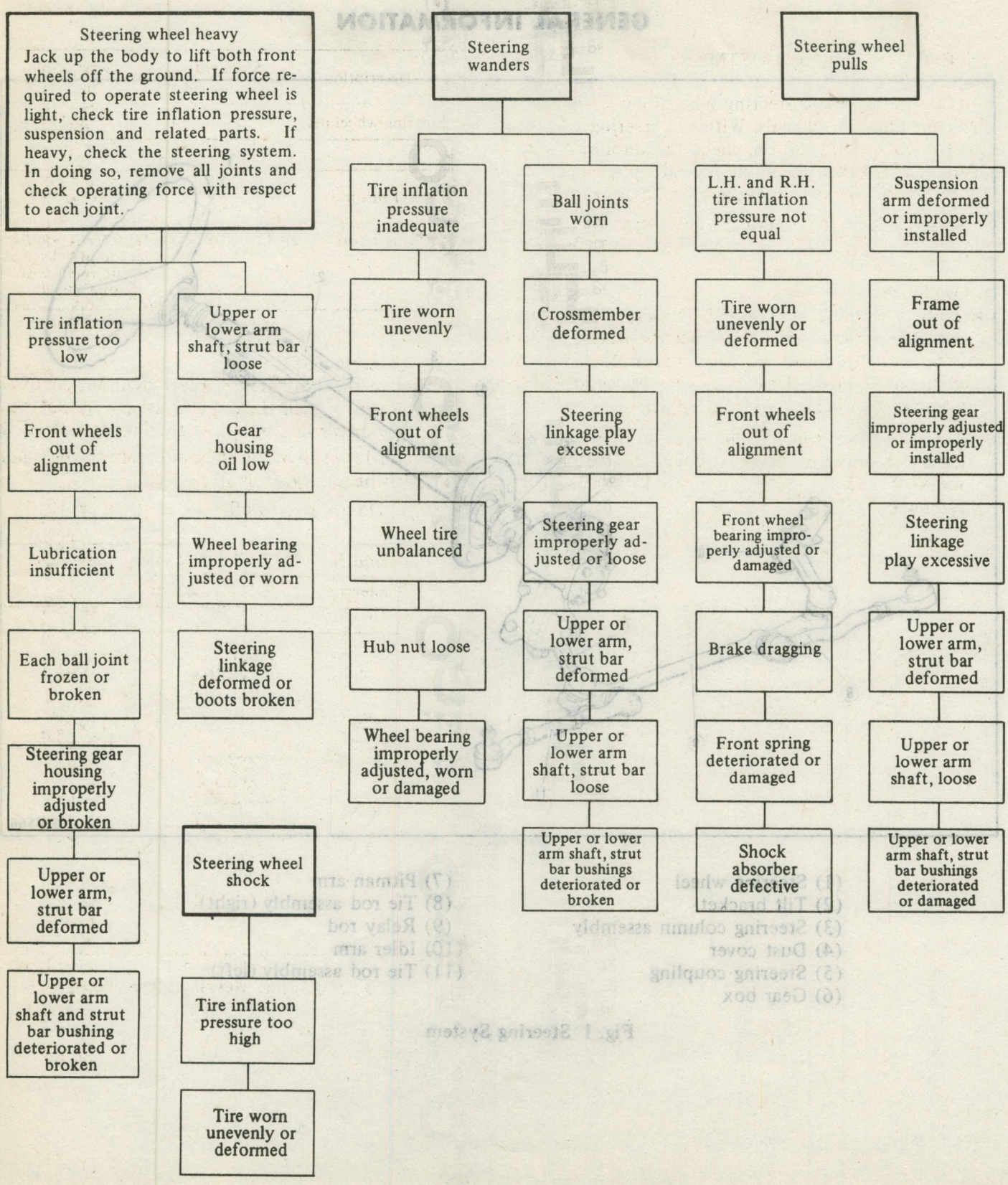
GENERAL INFORMATION



(1) Steering wheel
(2) Tilt bracket
(3) Steering column assembly
(4) Dust cover
(5) Steering coupling
(6) Gear box
(7) Pitman arm
(8) Tie rod assembly (right)
(9) Relay rod
(10) Idler arm
(11) Tie rod assembly (left)

Fig. 1 Steering System

TROUBLE SHOOTING



SERVICE PROCEDURES

INSPECTION AND ADJUSTMENT

(1) Checking the Steering Wheel Play

Jack up the front wheels. With the steering wheel in the straight ahead position, check the amount of play. If necessary, adjust the amount of steering wheel play by means of the steering gear housing adjusting bolt.

Make certain the steering wheel turns lightly and smoothly.

CAUTIONS:

- **Since a variable ratio gear is employed to manual steering gear it is necessary to place the steering wheel in the straight ahead position (neutral) when the adjustment is made. Otherwise gear backlash will be too small, resulting in a damaged gear.**
- **The adjusting bolt should not be tightened too much; otherwise more steering effort will be required and steering recovery will be adversely affected.**

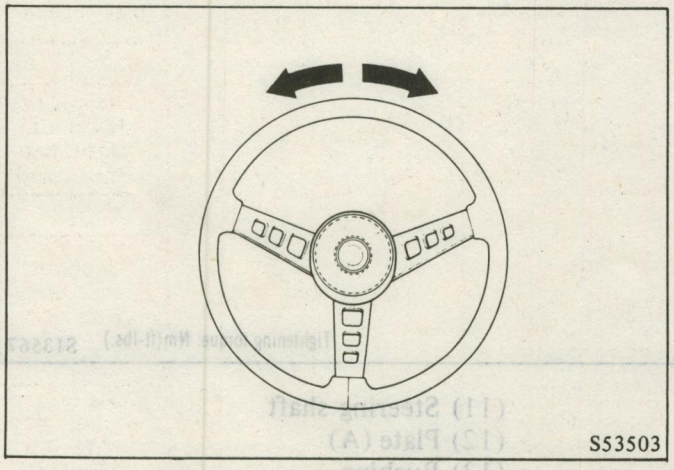


Fig. 2 Steering Wheel Adjustment

Description	Standard value mm (in.)	Service limit mm (in.)
Steering wheel play	25 (Within 1)	50 (2)

Description	Standard value N (lbs.)	Remarks
Steering effort	29.4 (6.6) or less	With front wheels jacked up, check at circumference of steering wheel.

(2) Steering Gear Oil

Remove the bolt at the lower right corner of the upper cover. Check the oil level using a special gauge or a screwdriver in absence of the level gauge. If the oil level is lower than the standard from the bolt hole, add oil as necessary. (Fig. 3)

NOTE: Do not overfil oil.

Description	Standard value	mm (in.)
Oil level	20. (.8)	

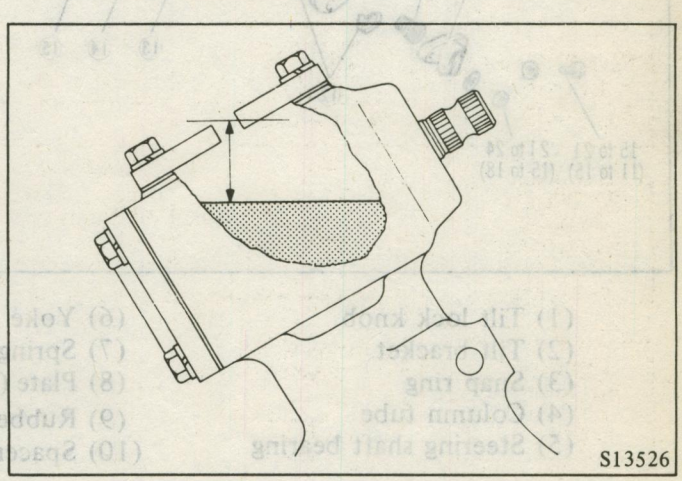
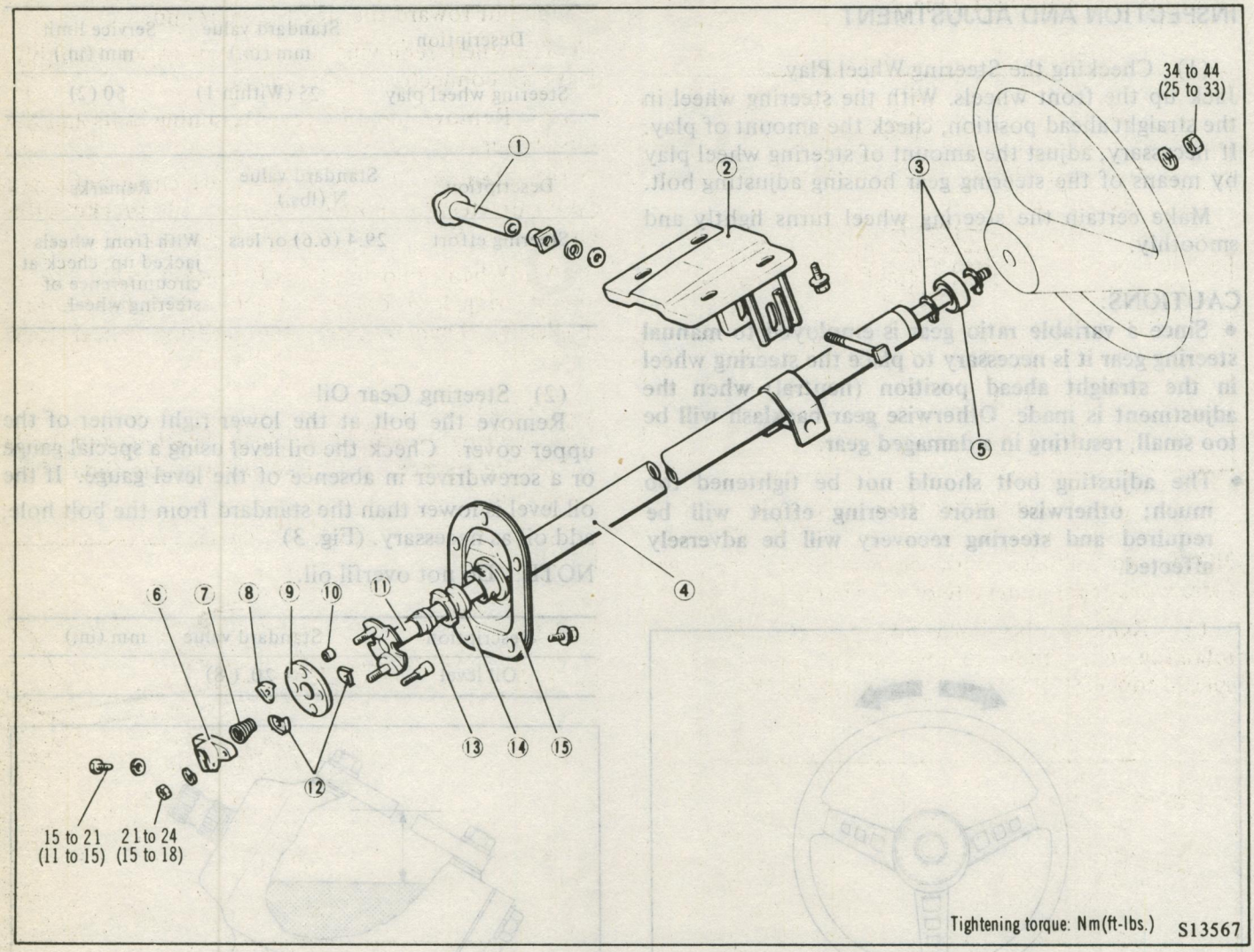


Fig. 3 Inspecting Steering Gear Oil Level

STEERING WHEEL AND SHAFT



(1) Tilt lock knob
(2) Tilt bracket
(3) Snap ring
(4) Column tube
(5) Steering shaft bearing
(6) Yoke
(7) Spring
(8) Plate (B)
(9) Rubber (Coupling)
(10) Spacer
(11) Steering shaft
(12) Plate (A)
(13) Bushing
(14) Dust seal
(15) Dust cover

Fig. 4 Exploded View of Steering Shaft

REMOVAL

(1) Remove air cleaner. Remove bolt tightening the clamp which couples the steering shaft and the gear box side mainshaft. (Fig. 5)

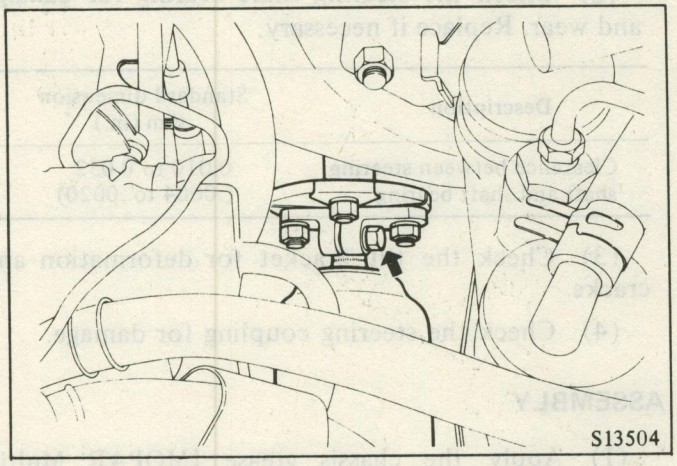


Fig. 5 Removing the Clamp Bolt

NOTE: In vehicles with an air conditioner, perform work from underside of the vehicle.

(2) Remove the horn pad and steering wheel retaining nut, then remove steering wheel using special tool (DT-1001-A) as shown in Fig. 6.

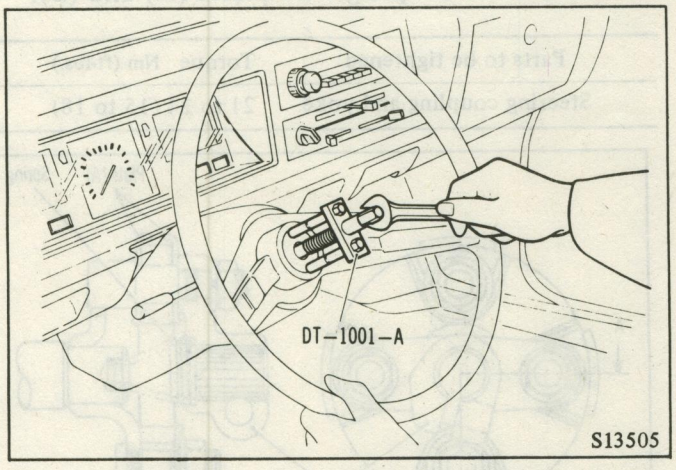


Fig. 6 Removing the Steering Wheel

CAUTION:
Use the special tool to remove the steering wheel. (Do not apply impact to the steering wheel with a hammer or the like.)

(3) Loosen the tilt lock knob and lower the steering column fully.

(4) Remove the column cover. Then disconnect each connector of the column switch and pull the switch out toward the steering shaft end.

NOTE: When removing the column as an assembly, leave all connector clamps intact.

(5) Remove the dust cover retaining bolts and the dust cover.

(6) Remove the tilt bracket attaching bolts and take out steering column with the tilt bracket attached.

(7) When removing the tilt bracket make a slit in the steering lock bracket attaching bolt head with a hacksaw. Then remove the steering wheel lock. (Fig. 7)

CAUTION:
The steering wheel upper lock bracket and bolts should be replaced with new parts at the time of installation.

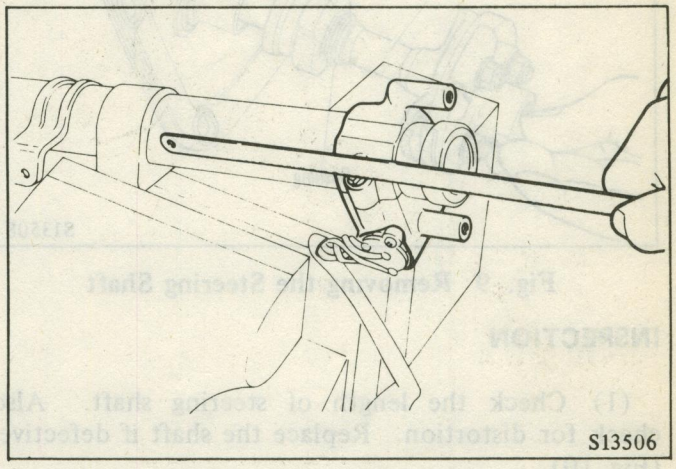


Fig. 7 Removing the Steering Wheel Lock Bracket

DISASSEMBLY

(1) Remove the snap ring with snap ring pliers. (Fig. 8)

(2) Remove the steering shaft together with dust seal and bushing from the column tube. (Fig. 9)

(3) Remove the yoke and coupling from the lower end of steering shaft.

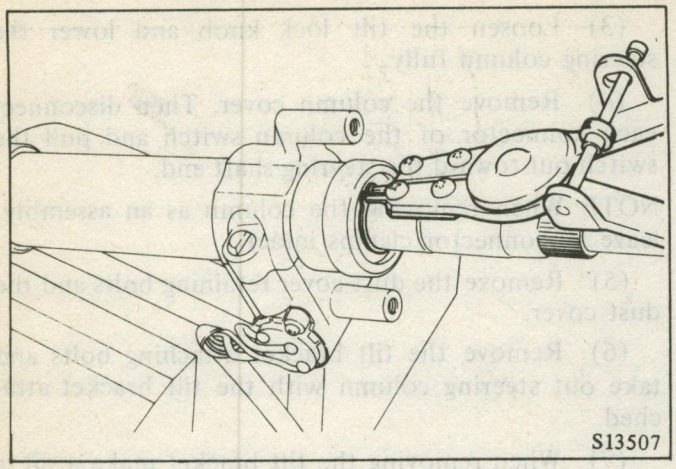


Fig. 8 Removing the Snap Ring

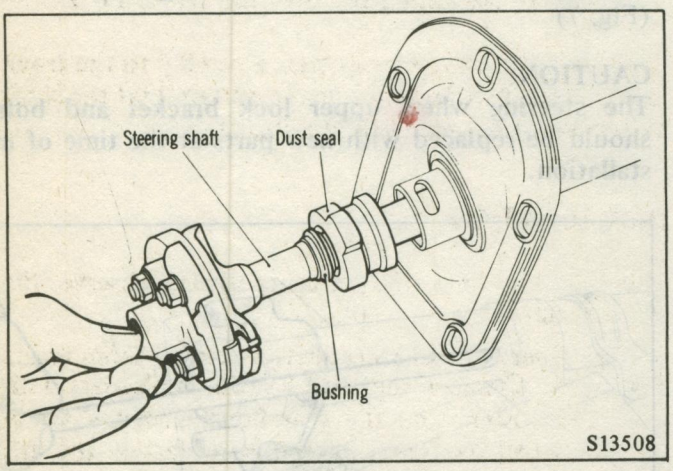


Fig. 9 Removing the Steering Shaft

INSPECTION

(1) Check the length of steering shaft. Also check for distortion. Replace the shaft if defective. (Fig. 10)

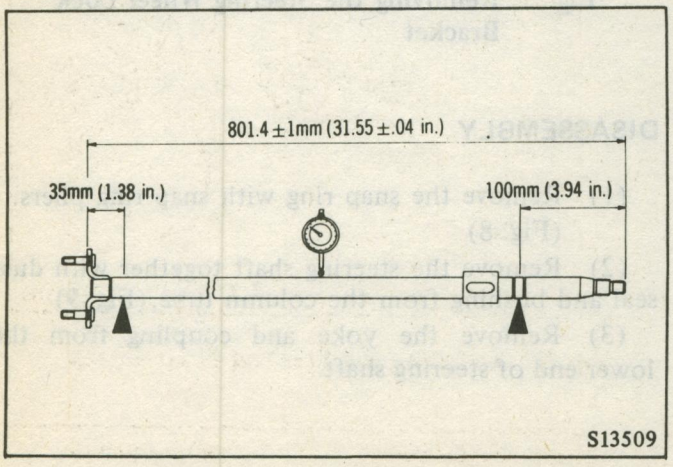


Fig. 10 Checking the Steering Shaft

Description	Standard dimension mm (in.)
Steering shaft length	801.4 ±1 (31.55 ±.04)
Steering shaft bend	Less than 0.5 (.020)

(2) Check the steering shaft bearing for damage and wear. Replace if necessary.

Description	Standard dimension mm (in.)
Clearance between steering shaft and shaft bearing	0.010 to 0.052 (.0004 to .0020)

(3) Check the tilt bracket for deformation and cracks.

(4) Check the steering coupling for damage.

ASSEMBLY

(1) Apply the chassis grease [MOPAR Multi-Mileage Lubricant (Part Number 2525035) or equivalent] to the shaft bearing, sliding surface of dust seal, and bushing.

(2) Attach coupling and yoke to the lower end of steering shaft. Tighten to the specified torque. (Fig. 11)

CAUTION:
Hold rubber of coupling with plates (A) and (B).

Parts to be tightened	Torque Nm (ft-lbs.)
Steering coupling and yoke	21 to 24 (15 to 18)

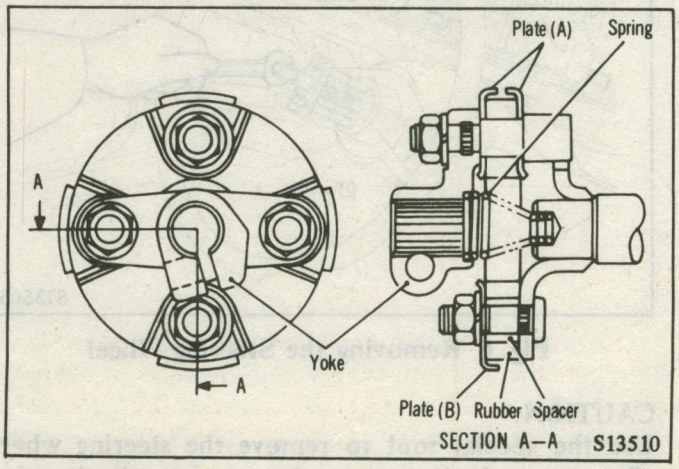


Fig. 11 Installing the Steering Coupling and Yoke

(3) Align tab on dust seal with groove on column tube to insert steering shaft into column tube.

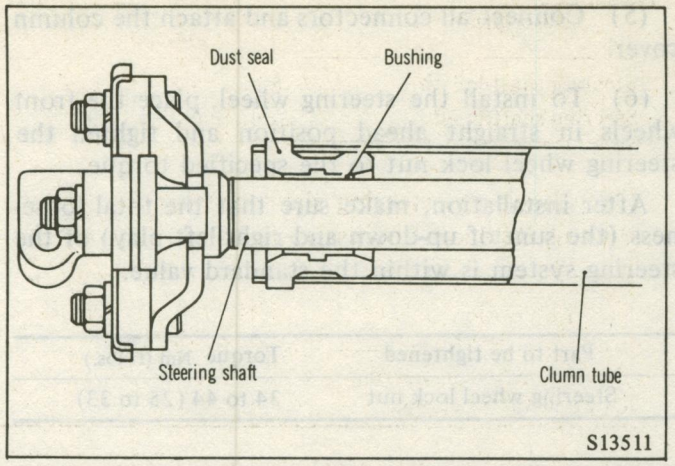


Fig. 12 Installing the Steering Shaft

(4) Fit snap ring into the groove on steering shaft.

(5) Install the tilt bracket on the column tube, insert the spacers between column tube and tilt bracket. Insert the bolt, and tighten the tilt lock knob with plain washer, spring washer and plain washer installed in that order. (Fig. 13)

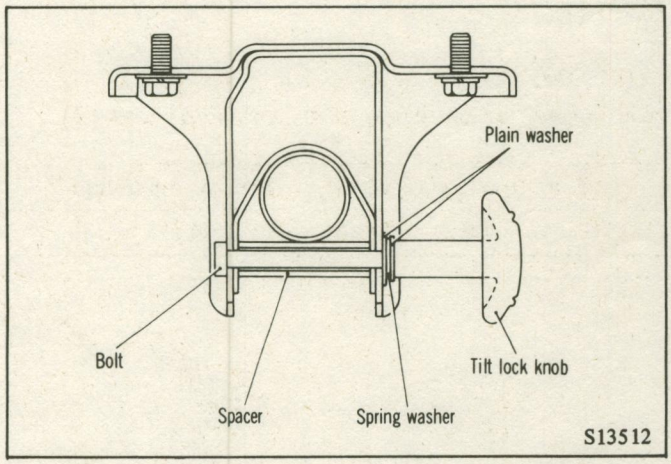


Fig. 13 Installing the Tilt Bracket

(6) Align the column tube hole with the wheel lock guide dowel and temporarily install the steering wheel lock. Then insert the ignition key to make sure the lock functions correctly. (Fig. 14)

CAUTION:
Securely tighten the steering wheel lock retaining bolts after installing the steering shaft to the truck body.

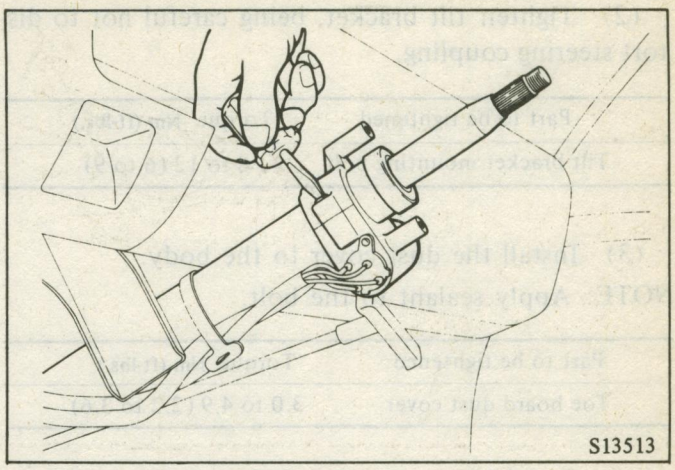


Fig. 14 Installing the Steering Wheel Lock

(7) Install the steering shaft assembly to the truck body. Before installation, make certain that the shaft can be easily turned with the fingers.

INSTALLATION

When installing the steering shaft, observe the followings:

(1) Insert the steering shaft assembly from inside the truck. Connect the gear housing mainshaft with bolt hole down, and the gear housing mainshaft in neutral position. Then temporarily fasten the tilt bracket to the body. (Fig. 15)

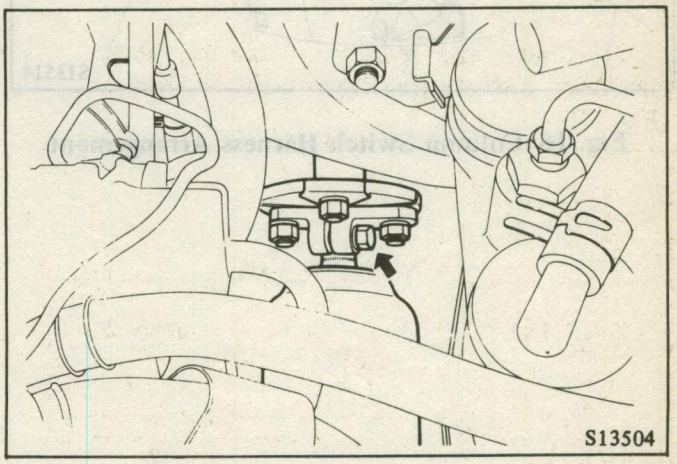


Fig. 15 Installing the Steering Shaft Clamp

Part to be tightened	Torque Nm (ft-lbs.)
Clamp tightening bolt	15 to 21 (11 to 15)

(2) Tighten tilt bracket, being careful not to distort steering coupling.

Part to be tightened	Torque Nm (ft-lbs.)
Tilt bracket mounting bolt	8 to 12 (6 to 9)

(3) Install the dust cover to the body.

NOTE: Apply sealant to the bolt.

Part to be tightened	Torque Nm (ft-lbs.)
Toe board dust cover	3.0 to 4.9 (2.2 to 3.6)

(4) Install the column switch to the column. Route the harness along the column tube and clip it securely. (Fig. 16)

NOTE: Route the harness in the center wherever possible, and clip to avoid interference with adjacent parts.

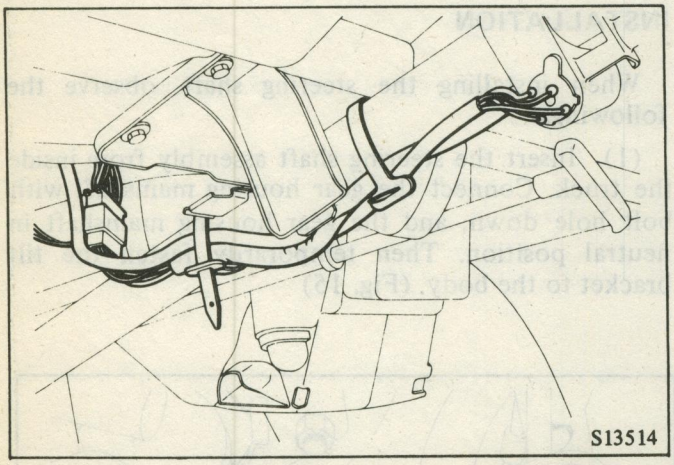


Fig. 16 Column Switch Harness Arrangement

(5) Connect all connectors and attach the column cover.

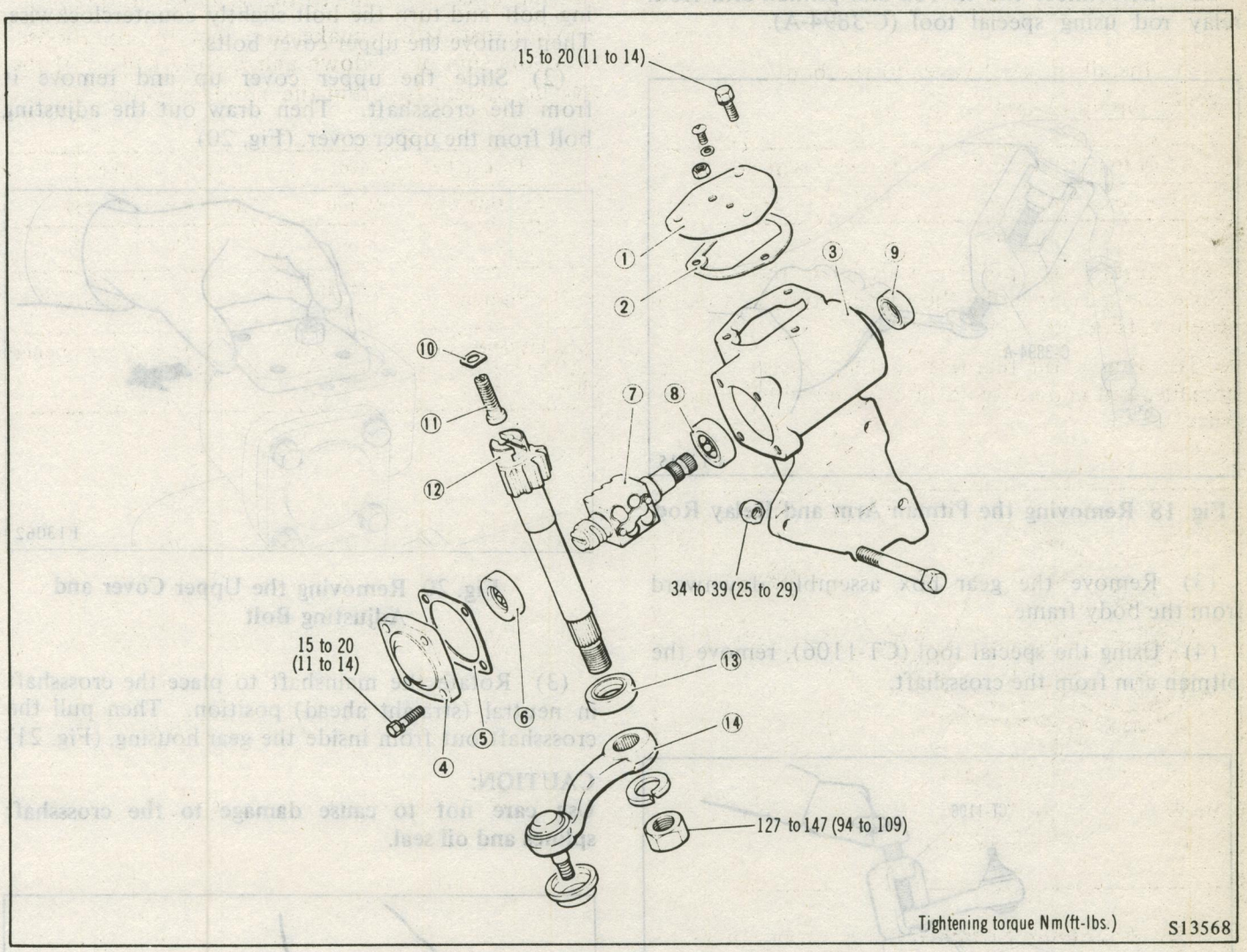
(6) To install the steering wheel, place the front wheels in straight ahead position and tighten the steering wheel lock nut to the specified torque.

After installation, make sure that the total looseness (the sum of up-down and right-left play) of the steering system is within the standard value.

Part to be tightened	Torque Nm (ft-lbs.)
Steering wheel lock nut	34 to 44 (25 to 33)

Description	Standard value mm (in.)	Remarks
Total looseness of installed steering wheel	Less than 1.0 (.04)	At the circumference of wheel

STEERING GEAR BOX



(1) Gear housing upper cover
(2) Packing
(3) Gear housing
(4) Gear housing end cover
(5) Mainshaft adjusting shim
(6) Mainshaft bearing
(7) Mainshaft assembly
(8) Mainshaft bearing
(9) Mainshaft oil seal
(10) Gear adjusting spacer
(11) Gear adjusting bolt
(12) Crossshaft
(13) Crossshaft oil seal
(14) Pitman arm

Fig. 17 Exploded View of Steering Gear

REMOVAL

(1) Remove the clamp bolt connecting steering shaft with the steering gear housing mainshaft.

(2) Disconnect the tie rod and pitman arm from relay rod using special tool (C-3894-A).

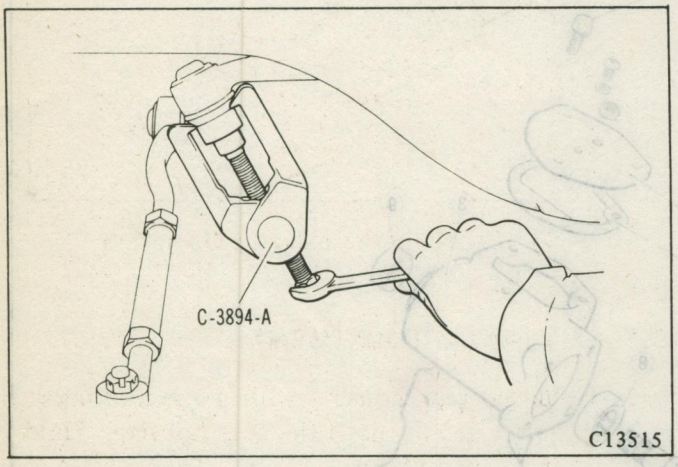


Fig. 18 Removing the Pitman Arm and Relay Rod

(3) Remove the gear box assembly downward from the body frame.

(4) Using the special tool (CT-1106), remove the pitman arm from the crossshaft.

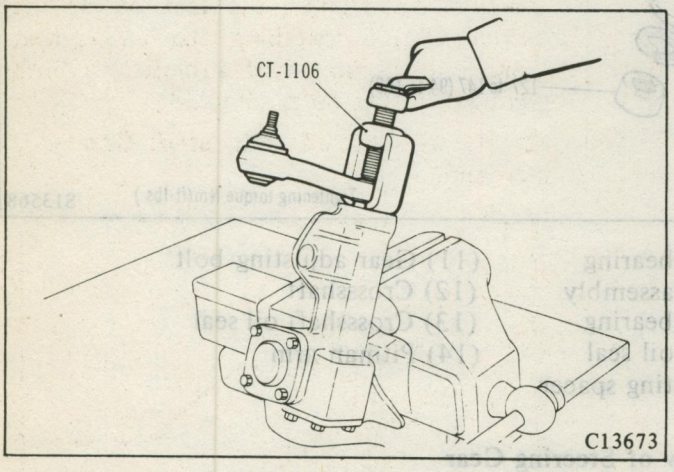


Fig. 19 Removing the Pitman Arm

DISASSEMBLY

Prior to disassembly, record the starting torque of the mainshaft (as a guide for reassembly).

(1) Loosen the lock nut for the gear box adjusting bolt and turn the bolt slightly counterclockwise. Then remove the upper cover bolts.

(2) Slide the upper cover up and remove it from the crossshaft. Then draw out the adjusting bolt from the upper cover. (Fig. 20)

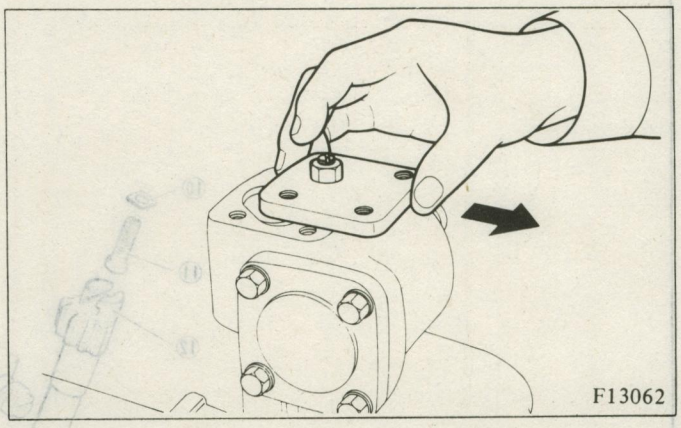


Fig. 20 Removing the Upper Cover and Adjusting Bolt

(3) Rotate the mainshaft to place the crossshaft in neutral (straight ahead) position. Then pull the crossshaft out from inside the gear housing. (Fig. 21)

CAUTION:
Use care not to cause damage to the crossshaft splines and oil seal.

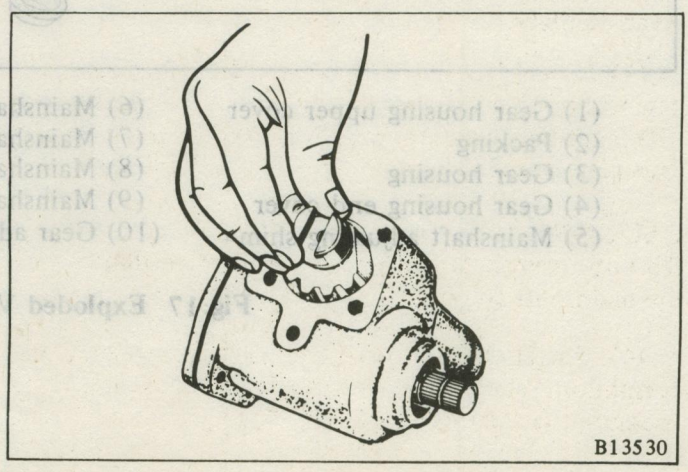


Fig. 21 Removing the Crossshaft

(4) Measure the mainshaft starting torque with the crossshaft removed.

(5) Loosen end cover attaching bolts and remove the end cover and shim.

NOTE: Keep the mainshaft adjusting shim for re-assembly.

(6) Gently pull out the mainshaft and ball nut assembly and bearings. (Fig. 22)

CAUTION:
Do not disassemble the mainshaft and ball nut assembly.

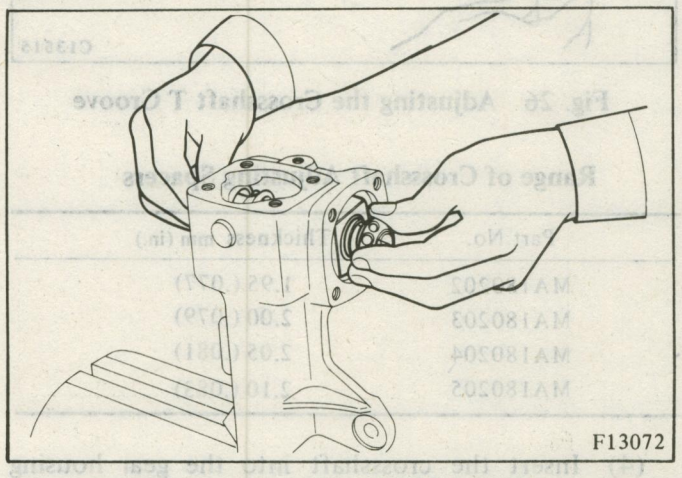


Fig. 22 Removing the Mainshaft

INSPECTION

(1) Check the clearance between the crossshaft and bushing. If excessive wear is present, replace either part or both as necessary.

(2) Check the mainshaft bearing for damage and wear. Replace if necessary.

(3) Check the operation of the ball nut and the mainshaft. Also check the amount of axial play of the mainshaft. If rotation is not smooth or if excessive free play is found, replace assembly. (Fig. 23)

CAUTION:
Do not attempt to move tha ball nut to either end of the mainshaft fully.

(4) Check the pitman arm for damage and deformation, check the ball stud for looseness, and measure the starting torque.

Description	Standard value Nm (in-lbs.)
Ball joint starting torque	0.5 to 1.5 (4.3 to 13)

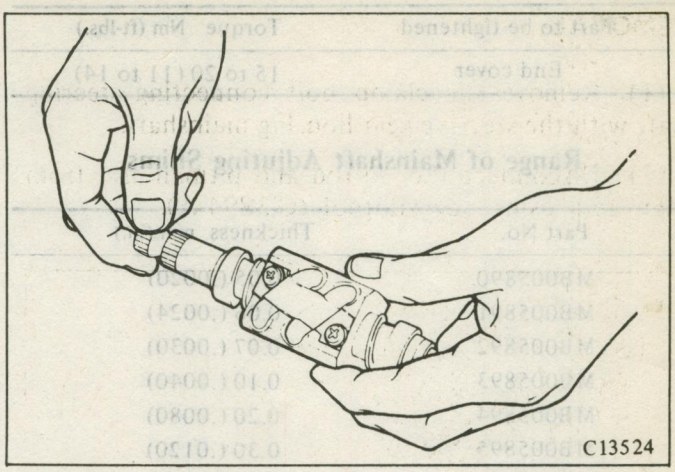


Fig. 23 Checking the Ball Nut Operation

ASSEMBLY AND ADJUSTMENT

(1) Hold the gear housing with a vise and insert the mainshaft assembly into the gear housing. Hold the mainshaft horizontally.

(2) Install the oil seal after applying a small amount of grease to its lip.

Specified grease	Quantity
MOPAR Multi-Mileage Lubricant Part Number 2525035 or equivalent	As required

(3) Install the gasket, shim, and gasket end cover to the housing. Tighten the lock nut to the standard torque. When installing the end cover, apply an appropriate amount of adhesive to both sides of the gasket and the bolts. (Fig. 24)

NOTE: Quantity of standard shim used: One 0.5 mm (.020 in.) shim.

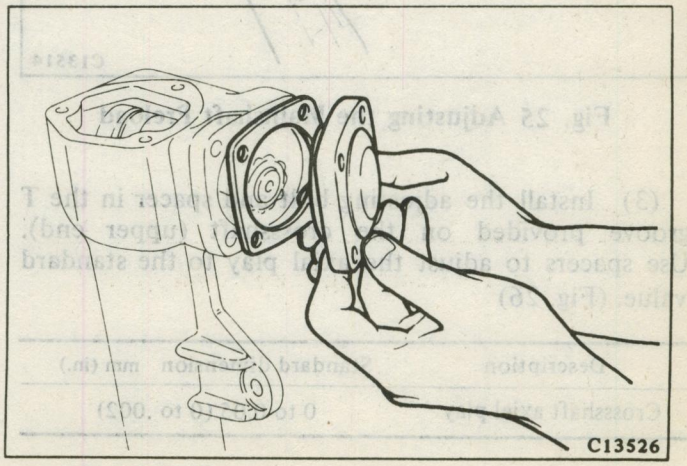


Fig. 24 Installing the End Cover

Part to be tightened	Torque Nm (ft-lbs.)
End cover	15 to 20 (11 to 14)

Range of Mainshaft Adjuting Shims

Part No.	Thickness mm (in.)
MB005890	0.05 (.0020)
MB005891	0.06 (.0024)
MB005892	0.07 (.0030)
MB005893	0.10 (.0040)
MB005894	0.20 (.0080)
MB005895	0.30 (.0120)
MB005896	0.50 (.0200)

(2) Measure the mainshaft preload using the special tool (CT-1108). If the measured preload is beyond the specified torque range, adjust it by reducing or increasing the assembled thickness of the shim(s). (Fig. 25)

Part to be tightened	Torque Nm (ft-lbs.)
Mainshaft preload (without crossshaft)	0.34 to 0.54 (3.0 to 4.8)

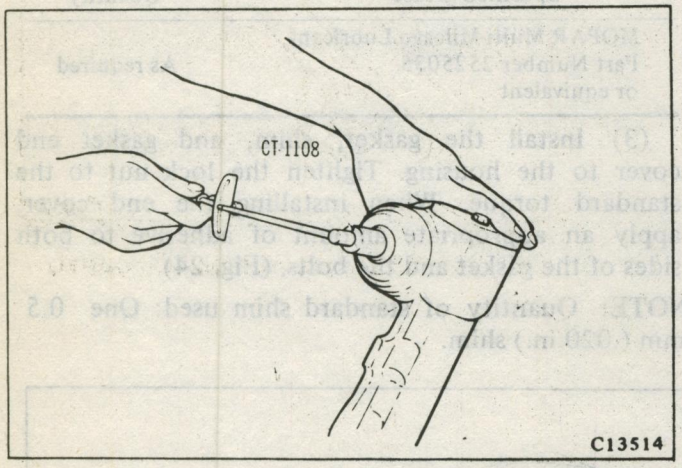


Fig. 25 Adjusting the Mainshaft Preload

(3) Install the adjusting bolt and spacer in the T groove provided on the crossshaft (upper end). Use spacers to adjust the axial play to the standard value. (Fig. 26)

Description	Standard dimension mm (in.)
Crossshaft axial play	0 to 0.05 (0 to .002)

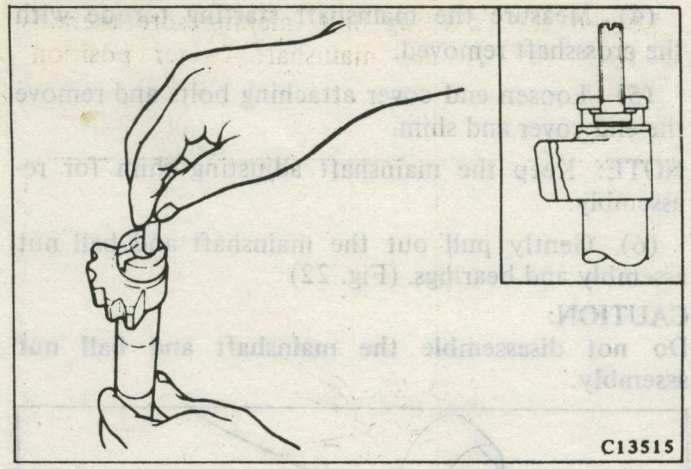


Fig. 26 Adjusting the Crossshaft T Groove

Range of Crossshaft Adjusting Spacers

Part No.	Thickness mm (in.)
MA180202	1.95 (.077)
MA180203	2.00 (.079)
MA180204	2.05 (.081)
MA180205	2.10 (.083)

(4) Insert the crossshaft into the gear housing and tighten the upper cover to the specified torque.

NOTES: 1. When inserting the crossshaft gear into mesh with the ball nut rack, be careful not to cause damage to the bushing and oil seal.

2. Apply a small amount of oil to the ball nut, crossshaft gear and shaft, and lightly grease the oil seal lip when installing the crossshaft.

Specified gear oil	Quantity
MOPAR Hypoid Gear Oil Part Number 3744994 or equivalent	As required

3. Apply an approptiate amount of adhesive to upper cover attaching bolts before installing the upper cover.

Part to be tightened	Torque Nm (ft-lbs.)
Upper cover	15 to 20 (11 to 14)

(5) Adjusting Bolt Adjustment

After moving the crossshaft a few times, turn the adjusting bolt in and out two to three times to adjust the crossshaft into proper mesh with the mainshaft.

Loosen the adjusting bolt, making sure there is no free play at the mainshaft center position. (Fig. 27)

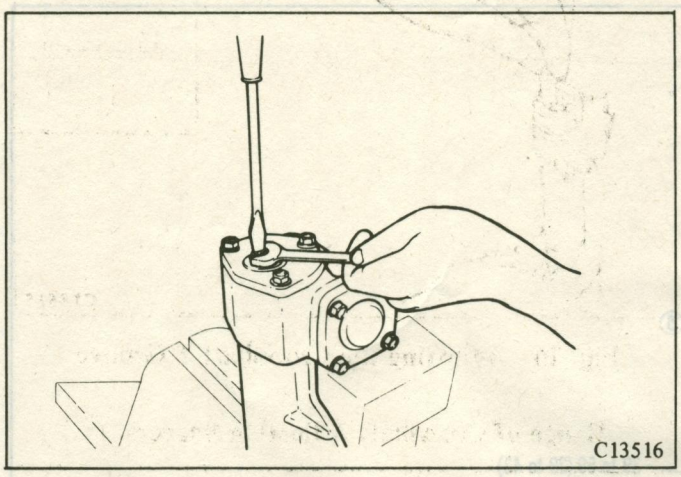


Fig. 27 Adjusting the Mainshaft Free Play

Description	Standard dimension mm (in.)
Crossshaft and mainshaft rack backlash (at center)	0 to 0.05 (o to .002)

(6) After completion of the reassembly, measure the mainshaft preload using the special tool (CT-1108).

If it exceeds the specified value, inspect for the following possible defects.

Description	Standard Torque Nm (ft-lbs.)
Mainshaft preload on assembly (combined starting torque)	0.64 to 0.83 (5.7 to 7.4)

(a) Crossshaft eccentricity by faulty upper cover installation.

(b) Damaged crossshaft bushing.

(c) Faulty end cover installation.

(7) Fill multipurpose gear oil through the filter plug.

Description	Quantity
MOPAR Hypoid Gear Oil Part Number 3744994 or equivalent	260 c.c. (.27 U.S.qts.) (.23 Imp.qts.)

INSTALLATION

When installing the steering gear box, observe the followings:

(1) Securely tighten the following parts to the specified torques.

Parts to be tightened	Torque Nm (ft-lbs.)
Gear box	34 to 39 (25 to 29)
Pitman arm and main shaft	127 to 147 (94 to 109)
Pitman arm and relay rod	34 to 44 (25 to 33)

(2) The crossshaft and pitman arm should be coupled by aligning the crossshaft end slit with the arrow mark on pitman arm and tightening to the specified torque.

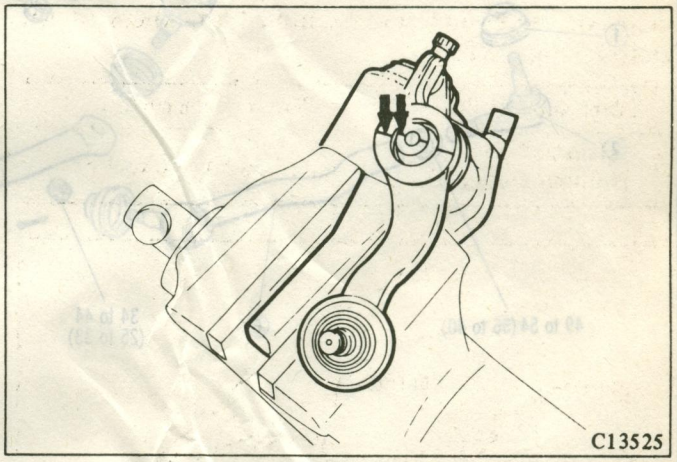
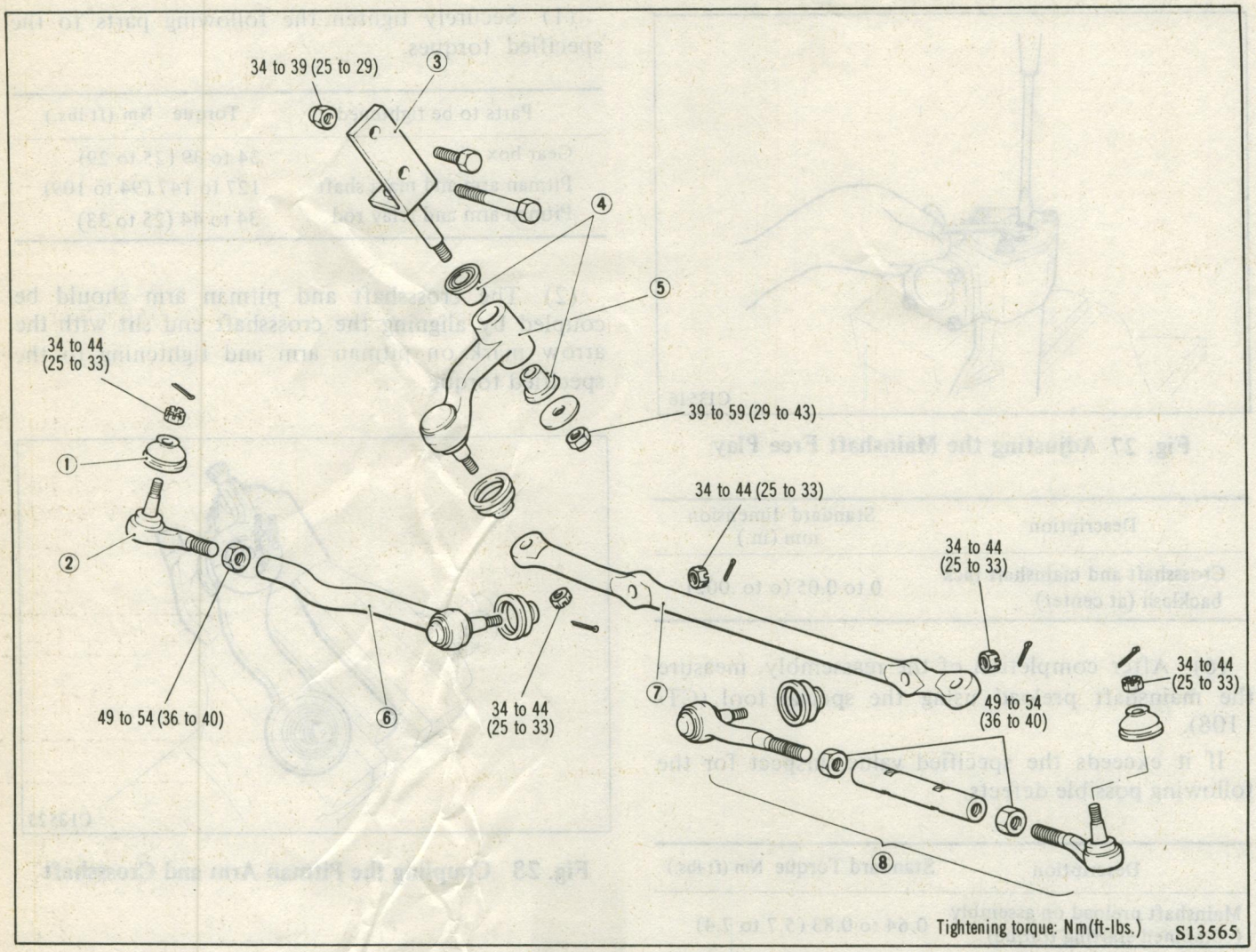


Fig. 28 Coupling the Pitman Arm and Crossshaft

STEERING LINKAGE



(1) Tie rod end dust cover
(2) Tie rod end, outer
(3) Idler arm bracket
(4) Idler arm bushing
(5) Idler arm
(6) Tie rod end, inner
(7) Relay rod
(8) Tie rod assembly, L.H.

Fig. 29 Steering Linkage Components

TIE ROD ASSEMBLY

Removal

(1) Disconnect the tie rod ends using special tool (C-3894-A). (Fig. 30)

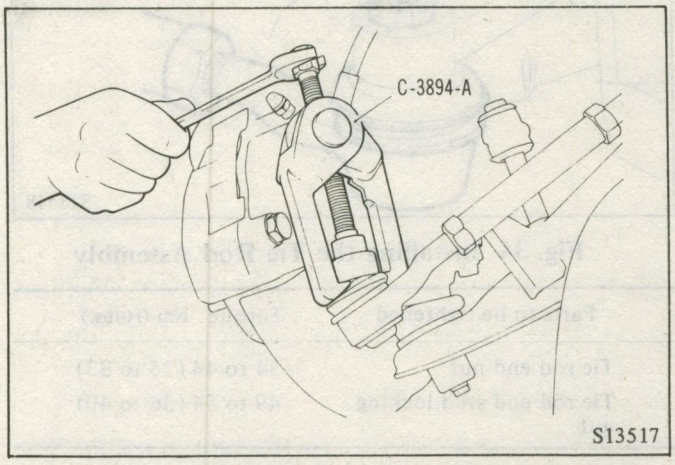


Fig. 30 Removing the Tie Rod End

(2) Remove the tie rod ends from the tie rods.

NOTES: 1. The tie rod end (outer) has a left-hand screw thread and the tie rod end (inner) has a right-hand screw thread.

2. The tie rod end socket is caulked with the plug and it cannot be disassembled.

Inspection

(1) Check the tie rod ends for damage and deformation. Replace if necessary.

(2) Grip the ball joint with pliers as shown in illustration, and, compressing the stud fully, measure the deflection and replace if necessary. (Fig. 31)

Description	Service limit mm (in.)
Ball joint deflection	1.5 (.06)

(3) Check dust covers for damage and cracks. Replace if necessary.

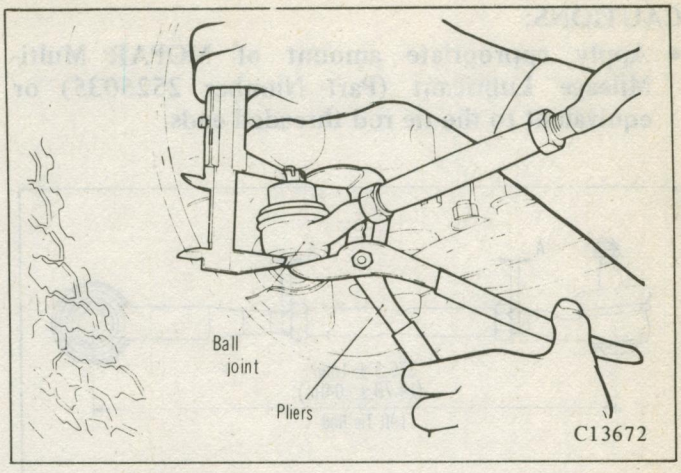


Fig. 31 Checking of Ball Joint Deflection

Installation

When installing the steering linkage, observe the followings:

(1) Coat the cover lip with grease and fill the inside of the dust cover with grease before installing a new dust cover. Apply packing sealer to the tie rod mounting surface.

Specified grease	Quantity c.c. (cu. in.)
MOPAR Multi-Mileage Lubricant Part Number 2525035 or equivalent	5 (.3)

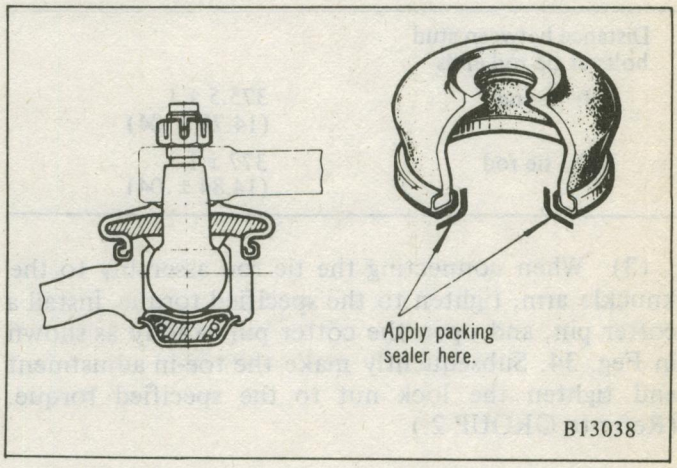


Fig. 32 Dust Cover Packing Sealer Application Points

(2) Temporarily tighten so that the standard amount of distance is provided between the stud bolts at both ends of the tie rod ends. (Fig. 33)

CAUTIONS:

- Apply appropriate amount of MOPAR Multi-Mileage Lubricant (Part Number 2525035) or equivalent to the tie rod threaded ends.

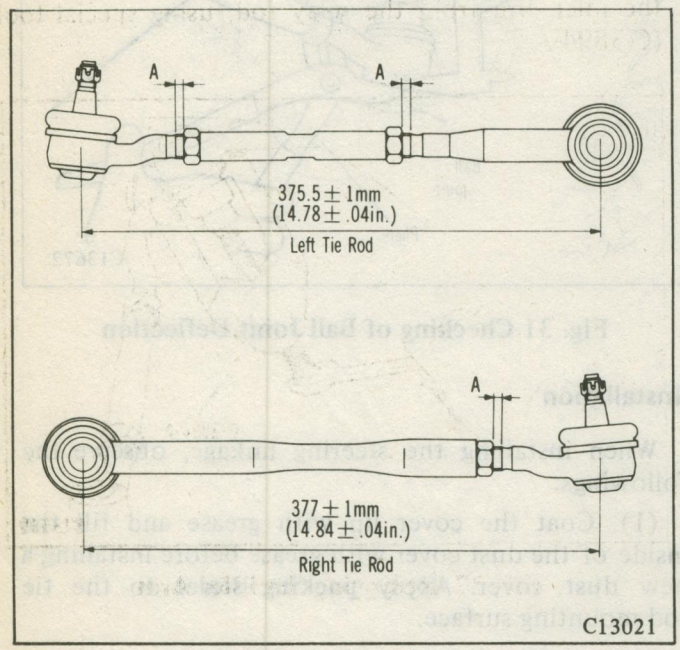


Fig. 33 Dimensions of Tie Rod and Tie Rod Ends Assembled

Description	Standard dimension mm (in.)
Distance between stud bolts at tie rod ends	
Left tie rod	375.5 ± 1 (14.78 ± .04)
Right tie rod	377 ± 1 (14.84 ± .04)

(3) When connecting the tie rod assembly to the knuckle arm, tighten to the specified torque, install a cotter pin, and open the cotter pin exactly as shown in Feg. 34. Subsequently make the toe-in adjustment and tighten the lock nut to the specified torque. (Refer to GROUP 2.)

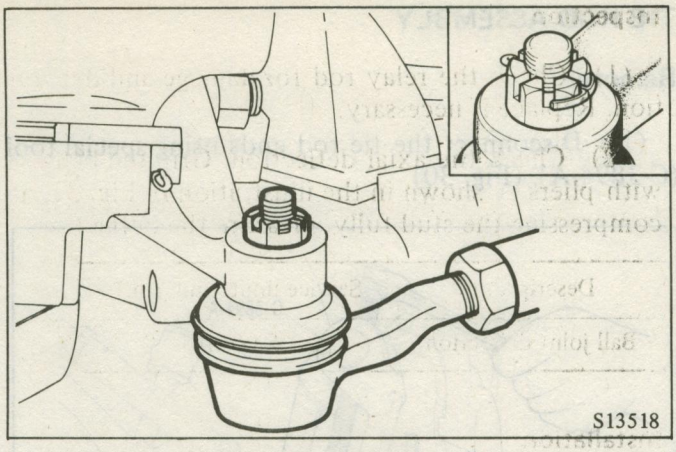


Fig. 34 Installing the Tie Rod Assembly

Parts to be tightened	Torque Nm (ft-lbs.)
Tie rod end nut	34 to 44 (25 to 33)
Tie rod end stud locking nut	49 to 54 (36 to 40)

RELAY ROD

Removal

(1) Disconnect the tie rod end joints using special tool. (C-3894-A).

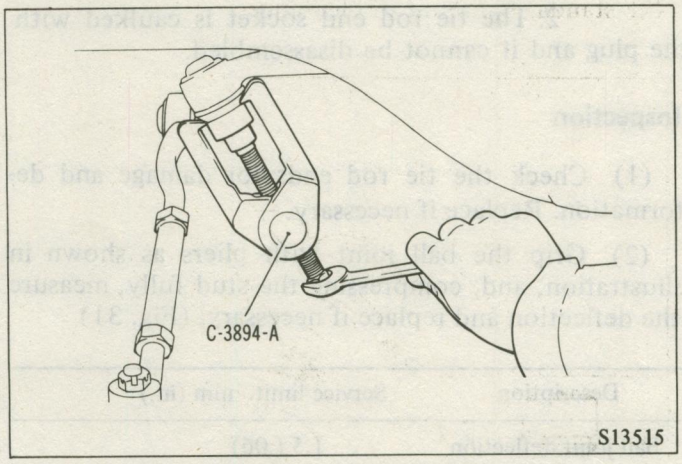


Fig. 35 Removing the Relay Rod

(2) Disconnect the pitman arm and idler arm from relay rod using the special tool. (C-3894-A).

Inspection

(1) Check the relay rod for damage and deformation. Replace if necessary.

(2) Check the axial deflection. Grip the ball joint with pliers as shown in the illustration in Fig. 31, and compressing the stud fully, measure the deflection.

Description	Service limit mm (in.)
Ball joint deflection	1.5 (.06)

Installation

When installing the relay rod, observe the following items.

(1) Tighten the relay rods to the specified torques below.

Parts to be tightened	Torque Nm (ft-lbs.)
Relay rod to pitman arm	34 to 44 (25 to 33)
Relay rod to idler arm	34 to 44 (25 to 33)

(2) After installation of the relay rod to the pitman arm and the idler arm, make certain there is the standard amount of clearance.

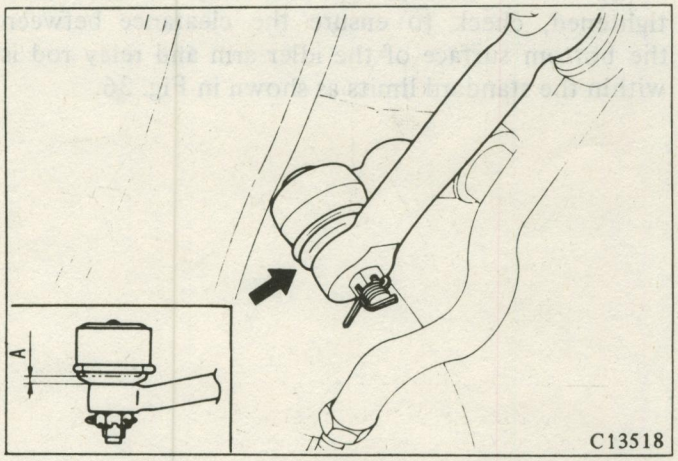


Fig. 36 Checking Relay Rod-to-Pitman Arm and Relay Rod-to-Idler Arm Clearance

Description	Standard value mm (in.)
Clearance between top end of relay rod and lower surface of idler arm and between top end of relay rod and lower surface of pitman arm (A)	3.7 to 4.3 (.15 to .17)

IDLER ARM

Removal

(1) Disconnect the tie rod end and disconnect the idler arm from the relay rod, using special tool (C-3894-A).

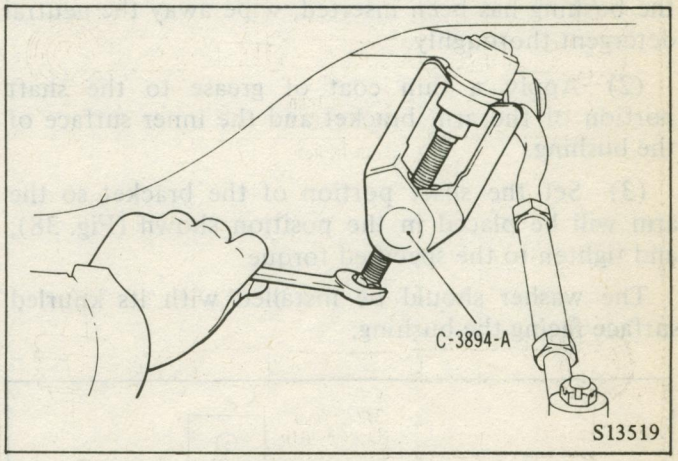


Fig. 37 Removing the Idler Arm

(2) Disconnect the idler arm support from the body frame and remove the idler arm assembly.

Disassembly

(1) Loosen the locking bolt and remove the idler arm shaft from bracket.

Inspection

(1) Check the idler arm for deformation and damage. Replace any defective part.

(2) Check the axial deflection. Grip the ball joint with pliers as shown in illustration, and, compressing the stud fully, measure the deflection. (Fig. 31)

Description	Service limit mm (in.)
Ball joint deflection	1.5 (.06)

(3) Check the dust cover for cracks and damage. Replace if necessary.

NOTE: When installing a new dust cover, apply a sufficient amount of grease to the cover lip and inside of dust cover.

Assembly

When assembling the idler arm, observe the followings:

(1) Apply neutral detergent to the inner surface of the idler arm and the outer surface of the bushing, and insert the bushing up to the flange of the bushing. If it is hard to insert, use a vice, etc. After the bushing has been inserted, wipe away the neutral detergent thoroughly.

(2) Apply a thin coat of grease to the shaft portion of the arm bracket and the inner surface of the bushing.

(3) Set the shaft portion of the bracket so the arm will be placed in the position shown (Fig. 38), and tighten to the specified torque.

The washer should be installed with its knurled surface facing the bushing.

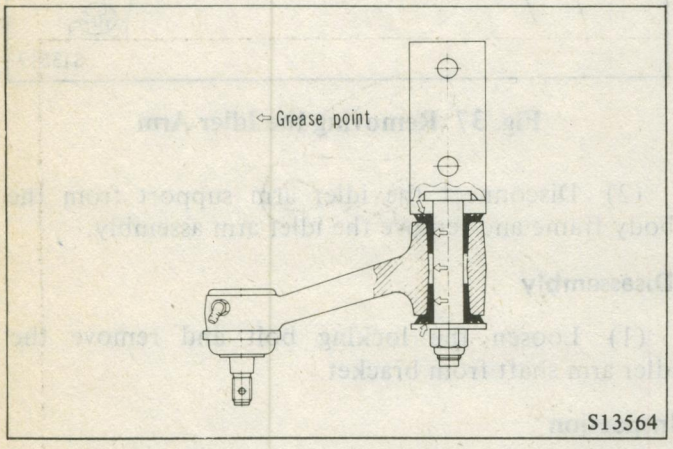


Fig. 38 Relative Position of Idler Arm and Support

Parts to be tightened	Torque Nm (ft-lbs.)
Tightening idler arm and bracket	39 to 59 (29 to 43)

CAUTIONS:

- **The tightening nut is self-locking type. Make certain that a new one is used whenever loosened.**
- **Apply grease to only the specified areas.**

NOTE: For dust cover installation and packing sealant application, refer to section on Tie Rod.

(4) After the idler arm is installed, check to ensure that the idler arm turning torque is within the specified limit.

Part to be tightened	Torque Nm (ft-lbs.)
Idler arm turning torque	3 to 9 (2.2 to 6.5)

Installation

(1) Tighten the idler arm to the body frame to the specified torque.

Parts to be tightened	Torque Nm (ft-lbs.)
Tightening idler arm bracket	34 to 39 (25 to 29)
Tightening idler arm and relay rod	34 to 44 (25 to 33)

(2) After the idler arm and relay rod have been tightened, check to ensure the clearance between the bottom surface of the idler arm and relay rod is within the standard limits as shown in Fig. 36.

POWER STEERING

GENERAL INFORMATION

INTEGRAL POWER STEERING GEAR BOX

The Rotary Valve Safety power steering gear displaces fluid to provide hydraulic fluid pressure assist when turning. The gear assembly is always filled with fluid and all internal components of the gear are immersed in fluid, making periodic lubrication unnecessary. In addition, the fluid acts as a cushion to absorb load shocks. All fluid passages are internal except the pressure and return hoses between the gear and pump. The rotary valve provides smooth steering with a minimum effort. A torsion bar transmits road feel to the driver. A one-piece rack-piston nut is geared to the sector shaft. An adjusting screw on the end of the shaft gear maintains lash between the sector shaft and rack piston.

POWER STEERING PUMP

The power steering pump is a constant displacement vane type providing hydraulic pressure for the steering system. The drive shaft is fitted with a pulley and is belt driven from the crankshaft. Ten vanes are mounted in radial slots in the rotor.

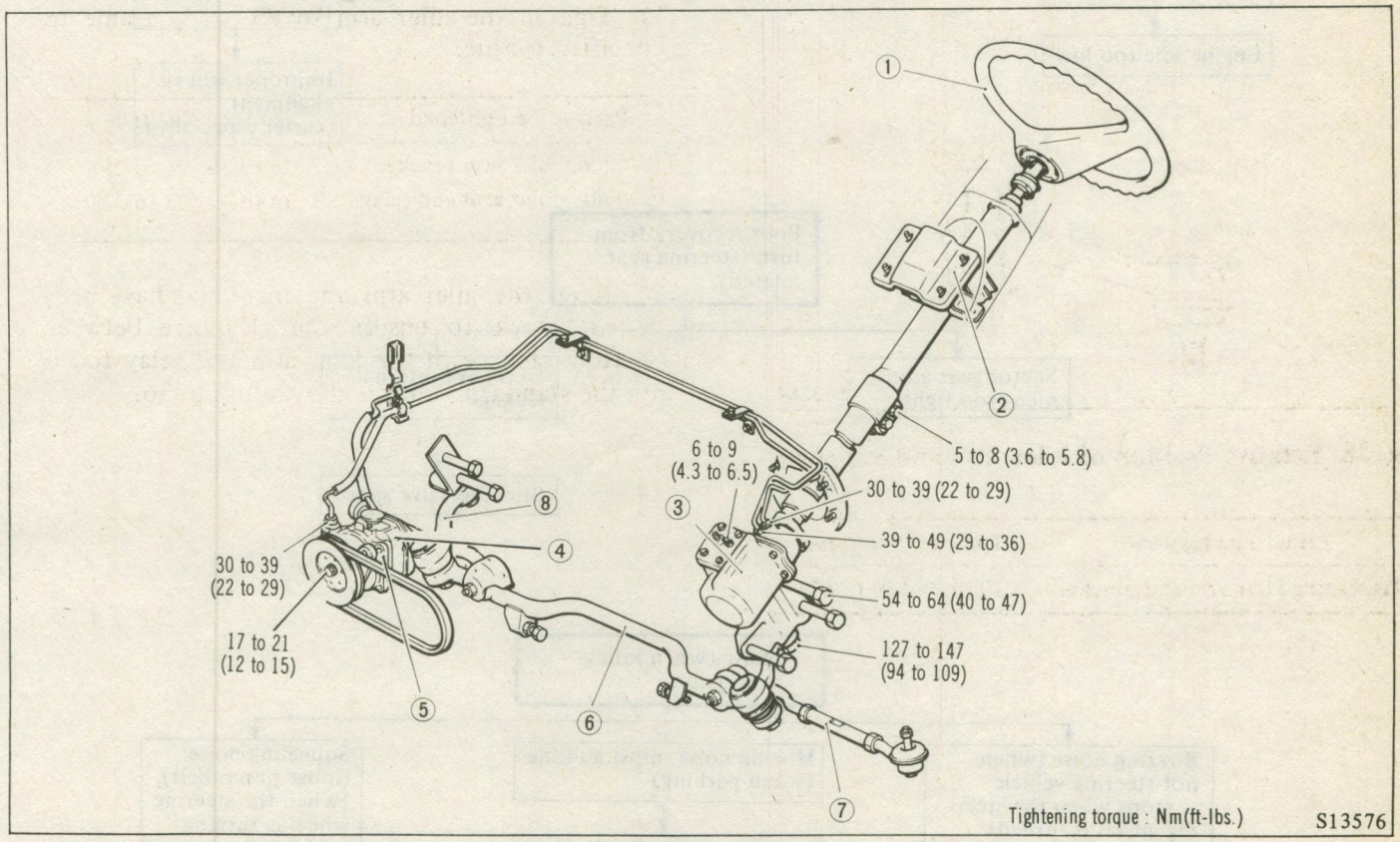
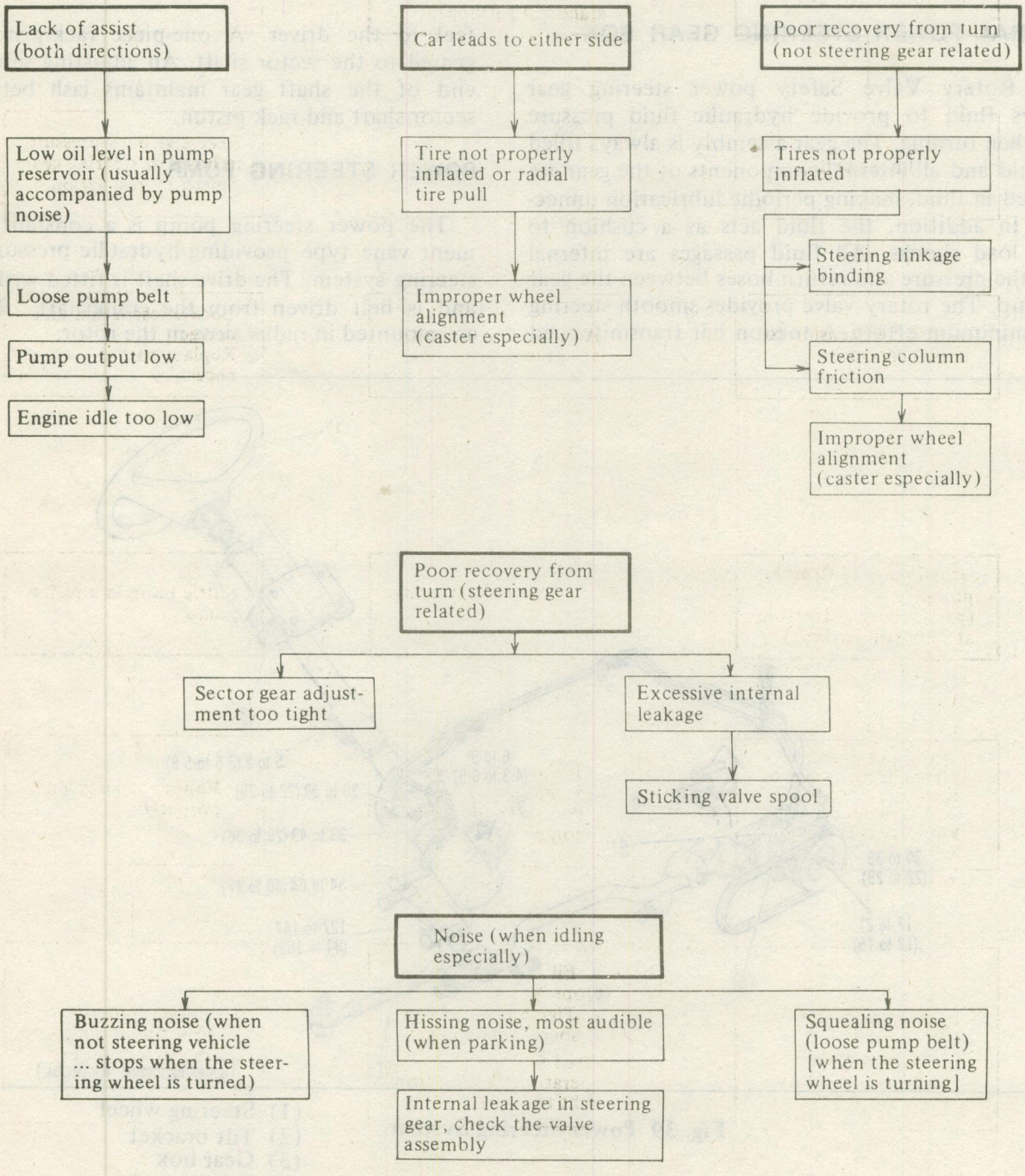


Fig. 39 Power Steering System

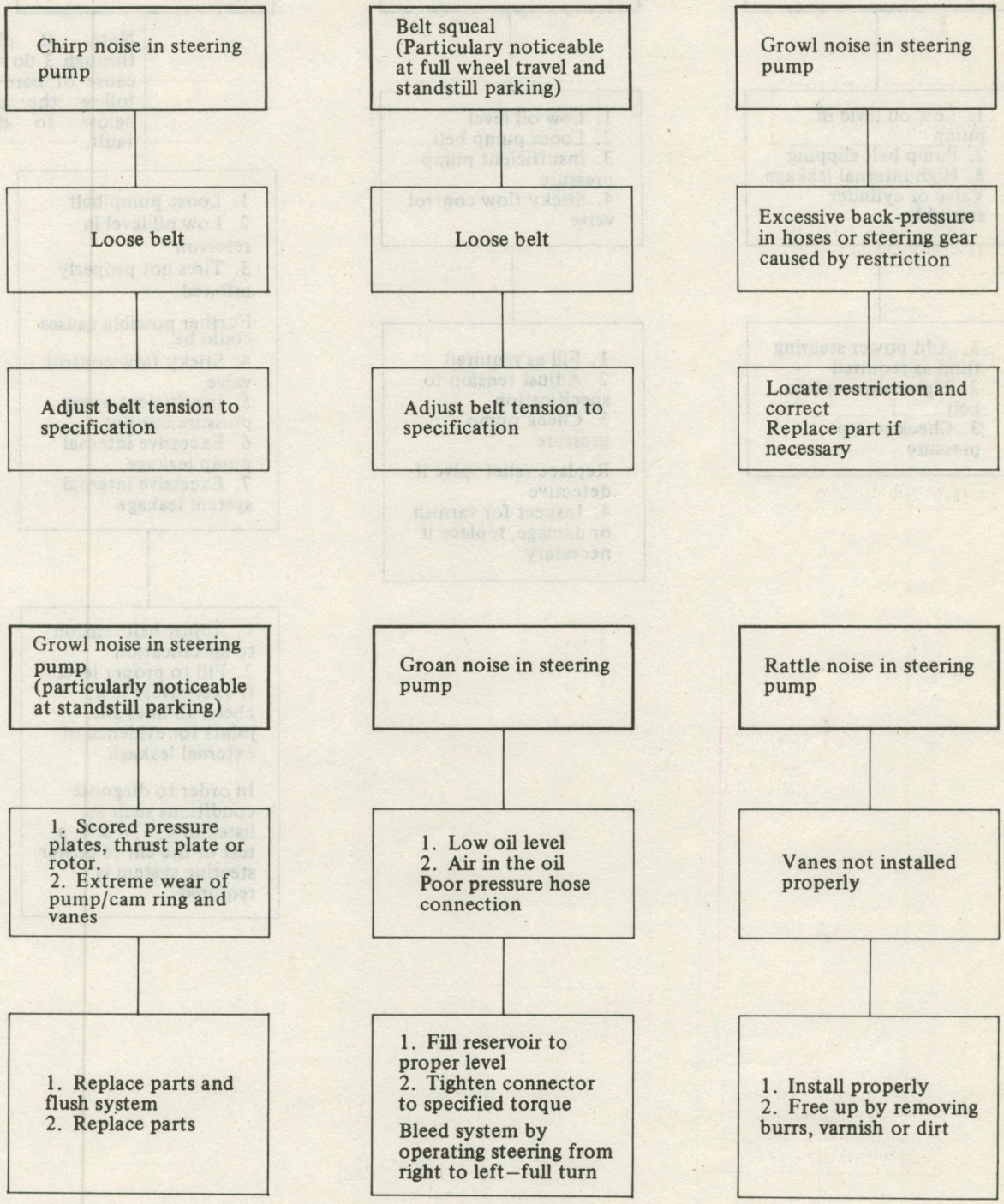
(1) Steering wheel
(2) Tilt bracket
(3) Gear box
(4) Oil reservoir
(5) Oil pump
(6) Relay rod
(7) Tie rod
(8) Idler arm

TROUBLE SHOOTING

Power Steering Gear Box



Oil Pump (Reservoir in separate type)



Momentary increase in effort when turning wheel fast to right or left

1. Low oil levle in pump
2. Pump belt slipping
3. High internal leakage Valve or cylinder assembly

1. Add power steering fluid as required
2. Tighten or replace belt
3. Check pump pressure

Steering wheel surges or jerks when turning with engine running especially during parking

1. Low oil level
2. Loose pump belt
3. Insufficient pump pressure
4. Sticky flow control valve

1. Fill as required
2. Adjust tension to specification
3. Check pump pressure

Replace relief valve if defective

4. Inspect for varnish or damage, replace if necessary

Hard steering or lack of assist especially in parking

Note: If checks 1 through 3 do not reveal cause of hard steering, follow the procedure below to determine fault.

1. Loose pump belt
2. Low oil level in reservoir
3. Tires not properly inflated

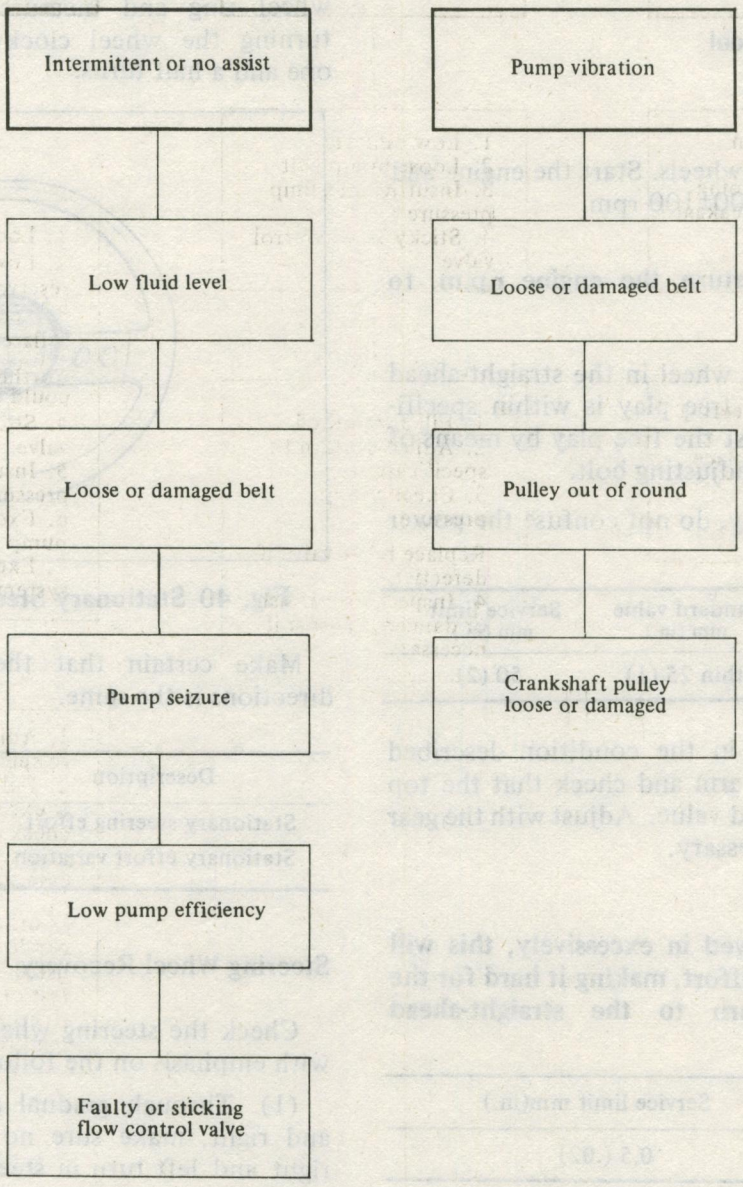
Further possible causes could be

4. Sticky flow control valve
5. Insufficient pump pressure out put
6. Excessive internal pump leakage
7. Excessive internal system leakage

1. Adjust belt tension to specification
2. Fill to proper level If excessively low, check all lines and joints for evidence of external leakage

In order to diagnose conditions such as listed in 4, 5, 6 & 7, a test of the entire power steering system is required

Oil Pump (Reservoir in unit type)



SERVICE PROCEDURES

INSPECTION AND ADJUSTMENT

Checking the Steering Wheel

Steering Wheel Play

(1) Jack up the front wheels. Start the engine and set the engine speed to 1000±100 rpm.

CAUTION:
After this inspection, return the engine r.p.m. to idling speed.

(2) With the steering wheel in the straight-ahead position, make sure the free play is within specification. If necessary, adjust the free play by means of the steering gear housing adjusting bolt.

When checking the play, do not confuse the power ON range with the play.

Description	Standard value mm (in.)	Service limit mm (in.)
Steering wheel play	Within 25 (1)	50 (2)

(3) With the wheels in the condition described above, move the Pitman arm and check that the top play is within the specified value. Adjust with the gear box adjusting bolt, if necessary.

CAUTION:
If adjusting bolt is screwed in excessively, this will cause increased steering effort, making it hard for the steering wheel to return to the straight-ahead position.

Description	Service limit mm(in.)
Pitman arm deflection	0.5 (.02)

Stationary Steering Effort

(1) Place the vehicle on the level pavement and place the steering wheel in the straight-ahead position.

(2) Start the engine and set the speed to 1000±100 rpm.

CAUTION:
Return the engine r.p.m. to idling speed.

(3) Attach the spring balance to the steering wheel ring and measure the tangential force by turning the wheel clockwise and counterclockwise one and a half turns.

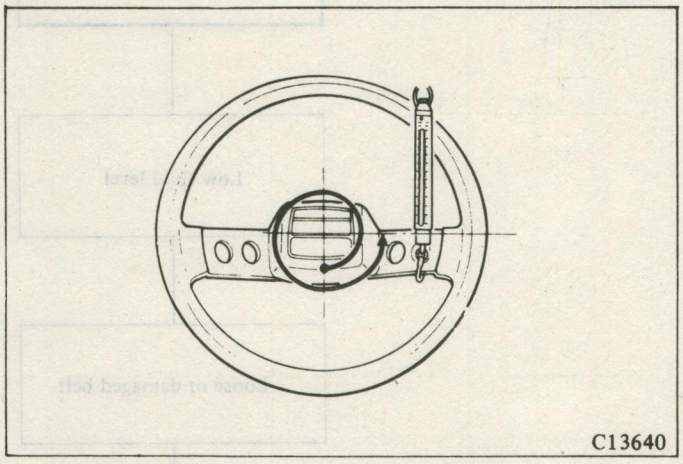


Fig. 40 Stationary Steering Effort Measurement

Make certain that the steering effort in both directions is the same.

Description	Standard value N (lbs.)
Stationary steering effort	29 (6.6) or less
Stationary effort variation	5.8 (1.3) or less

Steering Wheel Recovery

Check the steering wheel recovery by running test, with emphasis on the following items.

(1) Through gradual and sharp turn to the left and right, make sure no difference is felt between right and left turn in steering effort and recovery of wheel.

(2) Drive the vehicle at 35 km/h (28 mph) and turn the steering wheel 90° to either direction, and let the steering wheel go. When the wheel returns 60° or more, the system is good.

NOTES: 1. When the steering wheels are turned fast, it tends to feel heavy. This is not a malfunction. It is due to shortage in displacement of the oil pump, particularly during idling.

2. Occasional hiss from gear box incidental to gradual steering or maximum steering to either direction is not malfunction.

3. Slight rattle incidental to gradual steering with the vehicle stationary is not a malfunction.

Checking Oil Pump Belt Tension

Check the belt for slackness by applying pressure of 100 N (22 lbs.) to the center of the belt.

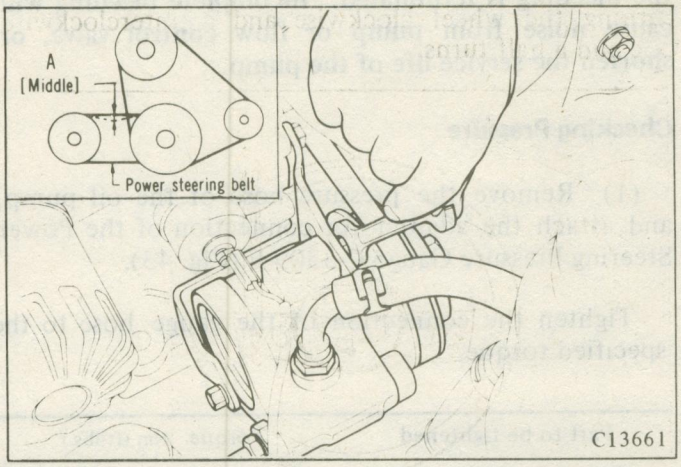


Fig. 41 Adjustment of Belt

Description	Standard value
Slack of belt A	7 to 10 mm/100 N (1/4 to 3/8 in./22 lbs.)

If necessary, adjust the belt by loosening the oil pump attaching bolts.

Tighten the adjusting bolt securely to the specified torque.

Part to be tightened	Torque Nm (ft-lbs.)
Oil pump brace bolt	26 to 40 (20 to 30)

Checking of Fluid Level

(1) Place the vehicle in a level position.

(2) Start the engine and turn the steering wheel a few times fully to the right and left while idling.

(3) Check the reservoir for presence of contamination. Replace oil if buffled or muddled.

(4) Fill the reservoir with MOPAR ATF DEXRON II (Part Number 3549660 or 4131509) or equivalent if the levle is low.

Replacement of Fluid

(1) Disconnect the oil cooler tube and return hose connector, insert a vinyl hose into the oil cooler tube, and receive the drain with an appropriate container.

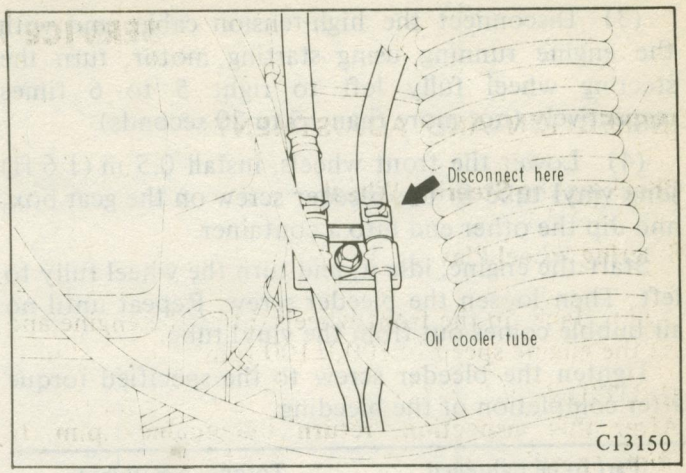


Fig. 42 Drainning of Fluid

(2) Jack up the front wheels and support the car body using rigid racks.

(3) Disconnect the high-tension cable and turn fully to right and left several times to drain the fluid from the gear box.

CAUTION:
Do not place the high-tension cable near the carburetor.

(4) Connect all hoses to the pump and fill the reservoir with the recommended ATF and bleed.

Description	Quantity cc (cu. in.)
MOPAR Automatic Transmission Fluid (DEXRON II) Part Number 3549660 or 4131509, or equivalent	1,060 (65) – for separate type reservoir 930 (56.8) – for unit type reservoir

Air Bleed

(1) Make certain the reservoir is filled to specification.

CAUTION:
Pay attention to the fluid level in the reservoir and bleed the air as recommended below.

Keep the fluid level to the specified range by refilling while bleeding. (Once the air has entered the fluid, it is difficult to bleed the air from it as the air tends to be trapped in very small pockets.)

(2) Jack up the front wheels and sustain the car body by rigid racks.

(3) Disconnect the high-tension cable, and with the engine running using starting motor, turn the steering wheel fully left to right 5 to 6 times respectively (not more than 15 to 20 seconds).

(4) Lower the front wheels, install 0.5 m (1.6 ft) long vinyl tube to the bleeder screw on the gear box, and dip the other end into a container.

Start the engine, idle it, and turn the wheel fully to left. Then loosen the bleeder screw. Repeat until no air bubble comes out from the vinyl tube.

Tighten the bleeder screw to the specified torque after completion of the bleeding.

Part to be tightened	Torque Nm (ft-lbs.)
Bleeder screw	6 to 9 (4.3 to 6.5)

(5) Check the fluid level, and refill if necessary. When turning the steering wheel left and right, check that the fluid level in the reservoir does not change more than 3 to 4 mm (.118 to .157 in.).

CAUTIONS:

- **Any abrupt rise in the fluid level after engine shut-off is a sign of incomplete bleeding.**
- **When air bubbles cease to form in the reservoir, the bleeding is terminated. Incomplete bleeding will cause noise from pump or flow control valve, or shorten the service life of the pump.**

Checking Pressure

(1) Remove the pressure hose of the oil pump, and attach the adapter for connection of the Power Steering Pressure Gauge C-3309-E (Fig. 43).

Tighten the connection of the gauge hose to the specified torque.

Part to be tightened	Torque Nm (ft-lbs.)
Attaching of gauge hose	30 to 39 (22 to 29)

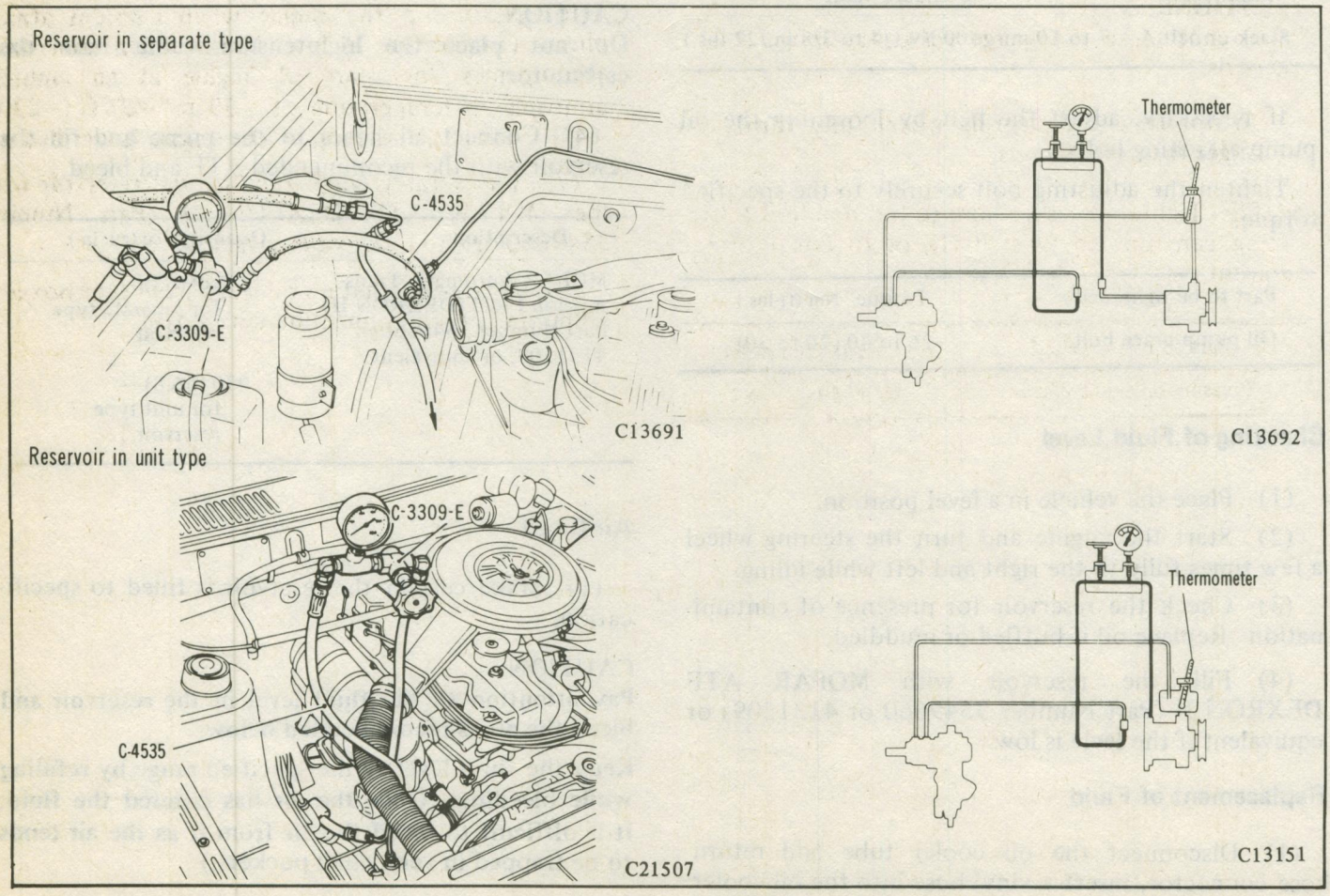


Fig. 43 Oil Pressure Measuring at Oil Pump

(2) Start the engine, allow the system to reach 50±5°C (122±7°F), and check the fluid level — adding any fluid if required.

(3) Close the gauge valve fully 3 times to bleed air in the pressure gauge. For any abnormality, refer to trouble shooting or diagnostic chart of oil pump.

(4) When the engine is at above temperature, the initial pressure read on the gauge (valve open and close) should be within the specifications as below.

Description	Standard value kPa (psi)
Oil pressure of oil pump	
Valve closed	7,355 to 8,336 (1,066 to 1,210)
Valve opened	981 (142) or less

(5) Shut off the engine, remove the pressure gauge and hoses, check fluid level or make needed repairs.

CAUTIONS:

- **Do not close the gauge valve any longer than 3 seconds.**
- **Do not keep the steering wheel fully turned any longer than 10 seconds.**

NOTE: Tighten pressure hose to the standard torque, taking care not to twist itself, or to interfere with adjacent parts.

Part to be tightened	Torque Nm (ft-lbs.)
Pressure hose installation	30 to 39 (22 to 29)

PRECAUTIONS ON HANDLING

The power steering system consists of parts of high accuracy. Handle them with care as specified below.

(1) Protect parts from contamination by water, dust, sand, etc. When disconnecting the hoses, cap the openings and the mating parts to keep out foreign material.

(2) Do not use any fluid except MOPAR ATF DEXRON II (Part Number 3549660 or 4131509) or equivalent.

(3) Take care not to make the fluid level too high or too low.

(4) Bleed air from the fluid so as to keep the level variation within 3 to 4 mm (.118 to .157 in.) at a constant temperature.

(5) Do not hold the steering wheel in right or left locked position any longer than 10 sec., while idling the engine.

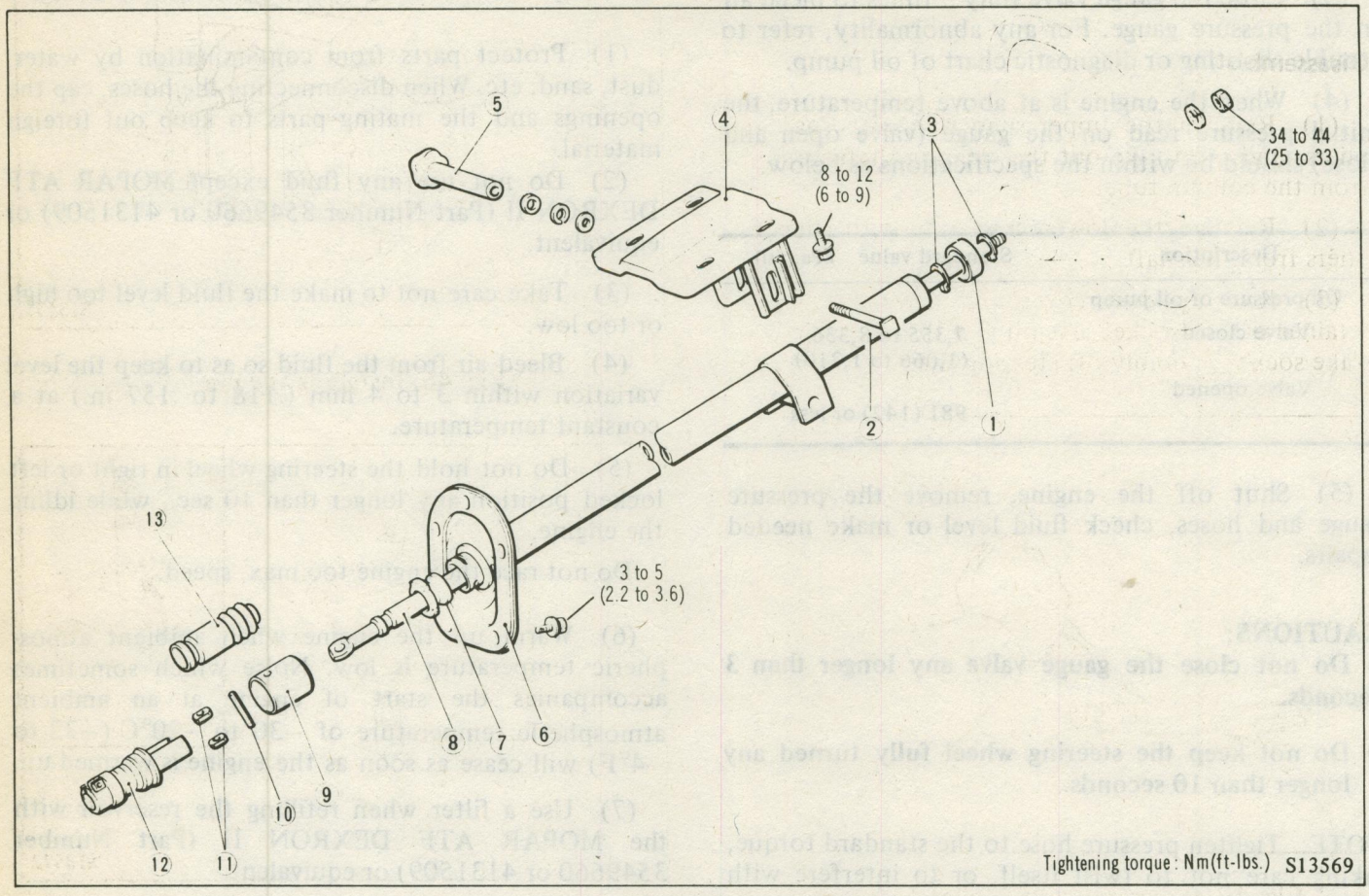
Do not race the engine too max. speed.

(6) Warm up the engine when ambient atmospheric temperature is low. Noise which sometimes accompanies the start of engine at an ambient atmospheric temperature of −30 to −20°C (−22 to −4°F) will cease as soon as the engine is warmed up.

(7) Use a filter when refilling the reservoir with the MOPAR ATF DEXRON II (Part Number 3549660 or 4131509) or equivalent.

(8) Make sure that no oil leaks from gear box and oil pump at their connection with hoses.

POWER STEERING SHAFT



(1) Steering shaft bearing
(2) Column tube
(3) Snap ring
(4) Tilt bracket
(5) Tilt knob
(6) Dash panel cover
(7) Dust seal
(8) Steering shaft
(9) Retainer
(10) Pin
(11) Slider
(12) Socket assembly
(13) Dust cover

Fig. 44 Exploded View of Power Steering Shaft

Removal

For removal of steering shaft from cabin and frame, refer to "Manual Steering Shaft"

Disassembly

(1) Remove the upper snap ring with snap ring pliers, and then take out the steering shaft assembly from the column tube.

(2) Remove the lower snap ring with snap ring pliers from the shaft.

(3) Roll up dust cover and drive the pressed retainer out of socket assembly with a suitable drift. Take socket assembly off steering shaft.

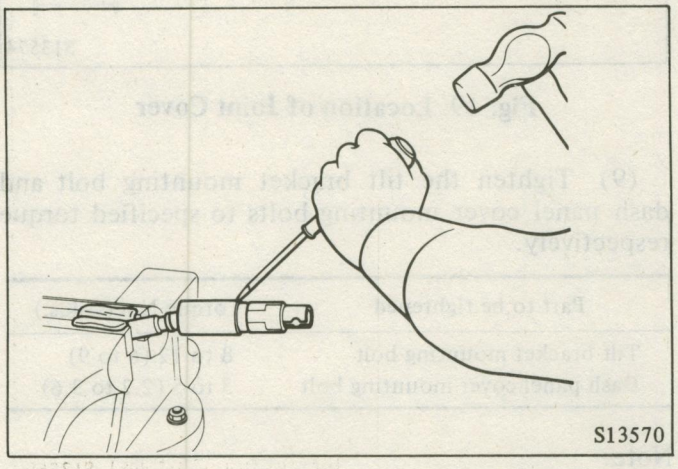


Fig. 45 Disassembly of Socket Assembly

Assembly

(1) Install bushing, dust cover and retainer onto steering shaft in that order.

(2) Install the pin across the end of steering shaft with a press or hammer, and apply a sufficient amount of grease to pin.

[MOPAR Multi-Mileage Lubricant (Part Number 2525035) or equivalent]

(3) Place sliders into socket assembly mounted on steering shaft.

(4) Using the steel pipe with 31 mm (1.2 in.) in inside diameter and 70 mm (2.76 in.) in length, press socket assembly into retainer.

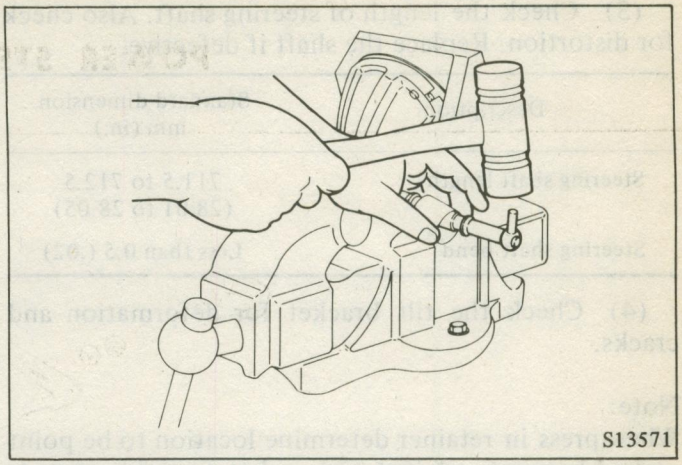


Fig. 46 Installing the Pin

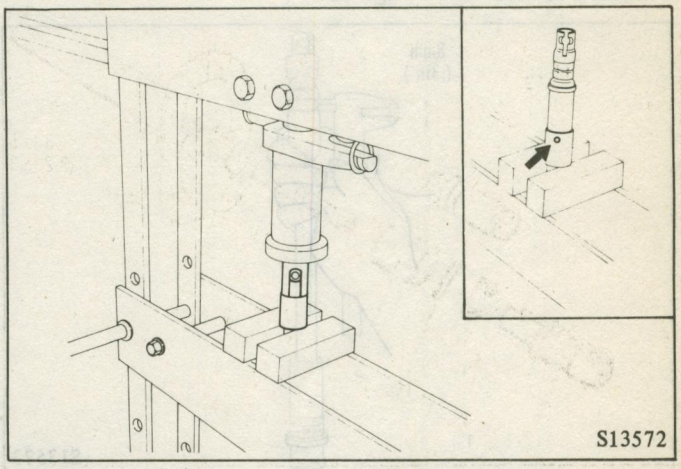


Fig. 47 Pressing the Socket Assembly

Inspection

(1) Check the pin for conditions, damage and wear. Replace if necessary.

(2) Check the sliders for conditions, damage and wear. Replace if necessary.

Description	Standard dimension mm (in.)
Clearance betwee slider and socket	0.50 to 0.55 (.020 to .021)

(3) Check the length of steering shaft. Also check for distortion. Replace the shaft if defective.

Description	Standard dimension mm (in.)
Steering shaft length	711.5 to 712.5 (28.01 to 28.05)
Steering shaft bend	Less than 0.5 (.02)

(4) Check the tilt bracket for deformation and cracks.

Note:
When press in retainer determine location to be point staked between retainer and socket assembly so as to avoid groove of socket in illustration as shown in Fig. 47 and depth to be pressed socket assembly into retainer as shown in Fig. 48.

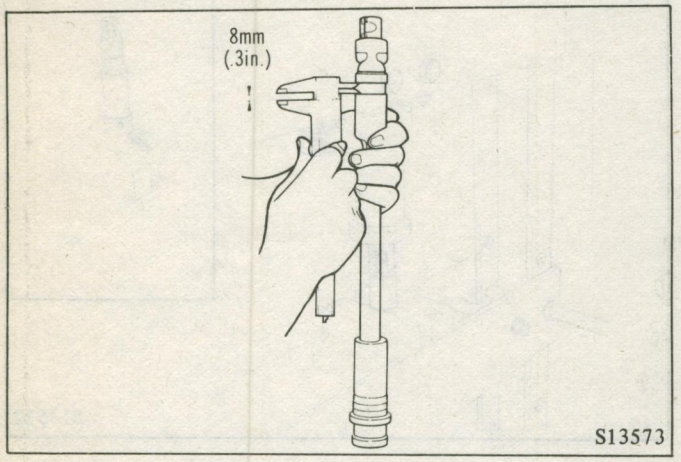


Fig. 48 Retainer Installing Depth

(5) Stake the retainer at two points with chisel and cover socket assembly with dust cover.

(6) Install lower snap ring onto steering shaft and insert steering shaft into column tube. Press bushing onto shaft.

(7) Install snap ring with snap ring pliers.

(8) Install dash panel cover and joint cover onto steering column and determine distance between end of joint cover and column cover as shown in specification. Tighten column clamp bolts to specified torque.

Description	Standard dimension mm (in.)
Distance between column clamp and joint cover end	457.6 to 459.6 (18.01 to 18.09)
Location of column clamp	19° to 25°

Part to be tightened	Torque Nm (ft-obs.)
Column clamp mounting bolt	5 to 8 (3.6 to 5.8)

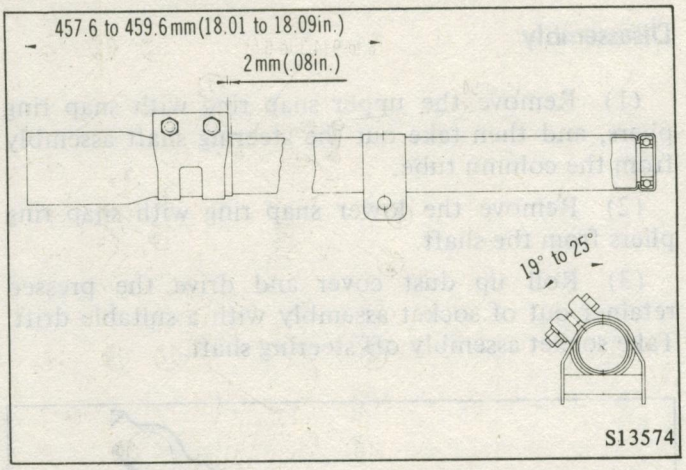


Fig. 49 Location of Joint Cover

(9) Tighten the tilt bracket mounting bolt and dash panel cover mounting bolts to specified torque respectively.

Part to be tightened	Torque Nm (ft-lbs.)
Tilt bracket mounting bolt	8 to 12 (6 to 9)
Dash panel cover mounting bolt	3 to 5 (2.2 to 3.6)

Note:
Make sure that there are specified clearance between steering column clamp and brake pedal. (Fig. 50)

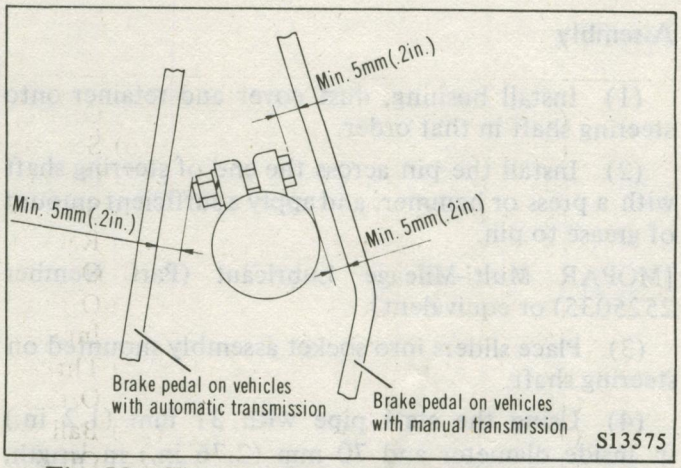
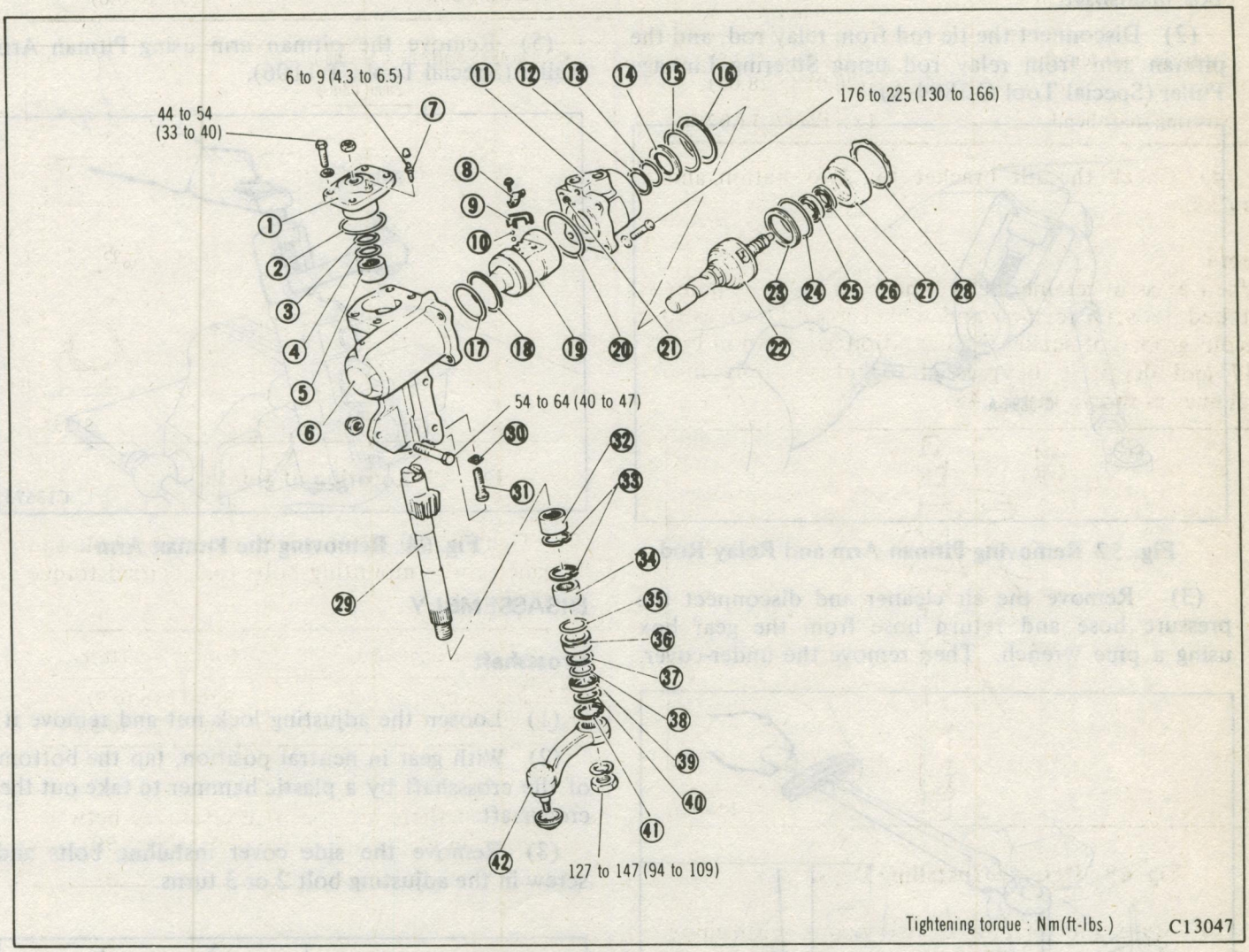


Fig. 50 Clearance between Column Clamp and Brake Pedal

(10) For installation of steering wheel, steering shaft and steering column, refer to "Manual Steering Shaft".

POWER STEERING GEAR BOX



(1) Side cover
(2) O ring
(3) O ring
(4) Seal ring
(5) Needle bearing
(6) Gear box
(7) Bleeder plug
(8) Circulator holder
(9) Circulator
(10) Ball
(11) Valve housing
(12) Seal ring
(13) O ring
(14) Thrust needle bearing
(15) O ring
(16) Seal ring
(17) O ring
(18) Seal ring
(19) Rack piston
(20) O ring
(21) O ring
(22) Input worm shaft
(23) Thrust needle bearing
(24) O ring
(25) Ball bearing
(26) Oil seal
(27) Top cover
(28) Nut
(29) Crossshaft
(30) Adjusting plate
(31) Adjusting bolt
(32) Needle bearing, upper
(33) Snap ring
(34) Needle bearing, lower
(35) O ring
(36) Seal housing
(37) Seal ring
(38) O ring
(39) Oil seal
(40) Backup ring
(41) Snap ring
(42) Pitman arm

Fig. 51 Steering Gear Box Components

REMOVAL

(1) Disconnect the steering shaft from the gear box mainshaft.

(2) Disconnect the tie rod from relay rod, and the pitman arm from relay rod using Steering Linkage Puller (Special Tool C-3894-A).

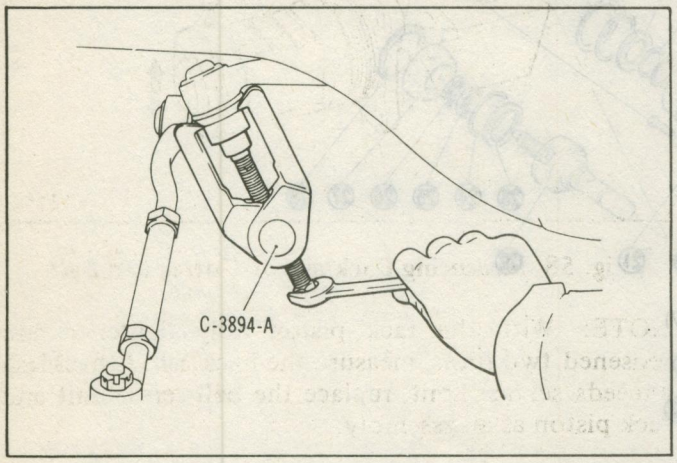


Fig. 52 Removing Pitman Arm and Relay Rod

(3) Remove the air cleaner and disconnect the pressure hose and return hose from the gear box using a pipe wrench. Then remove the under-cover.

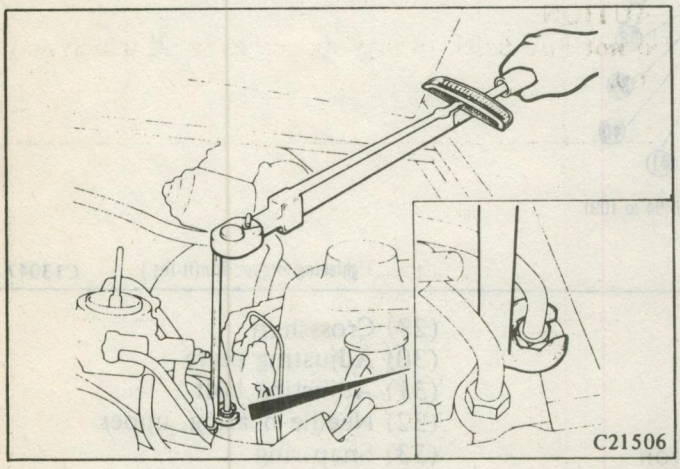


Fig. 53 Removing the Pressure Hoses Connector

(4) Loosen the gear box mounting bolts.

On vehicle with automatic transmission, remove the throttle linkage with the throttle linkage splash shield.

On vehicle with manual transmission, remove the starter on transmission.

Then take out the gear box downward.

CAUTION:
Set fuel line aside to facilitate the gear box removal and reinstallation.

(5) Remove the pitman arm using Pitman Arm Puller (Special Tool CT-1106).

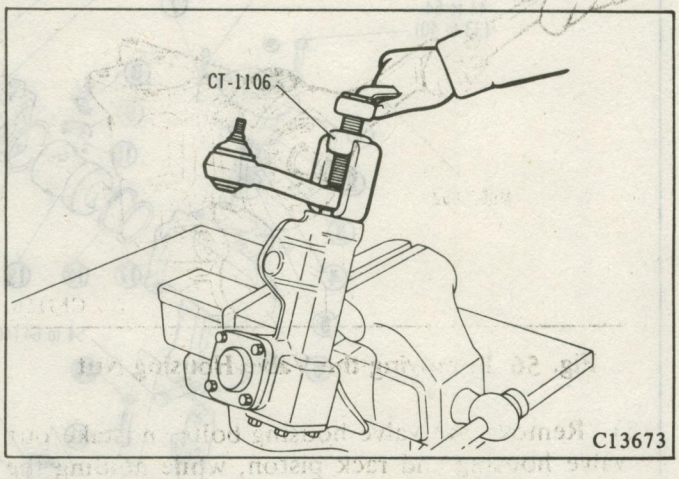


Fig. 54 Removing the Pitman Arm

DISASSEMBLY

Crossshaft

(1) Loosen the adjusting lock nut and remove it.

(2) With gear in neutral position, tap the bottom of the crossshaft by a plastic hammer to take out the crossshaft.

(3) Remove the side cover installing bolts and screw in the adjusting bolt 2 or 3 turns.

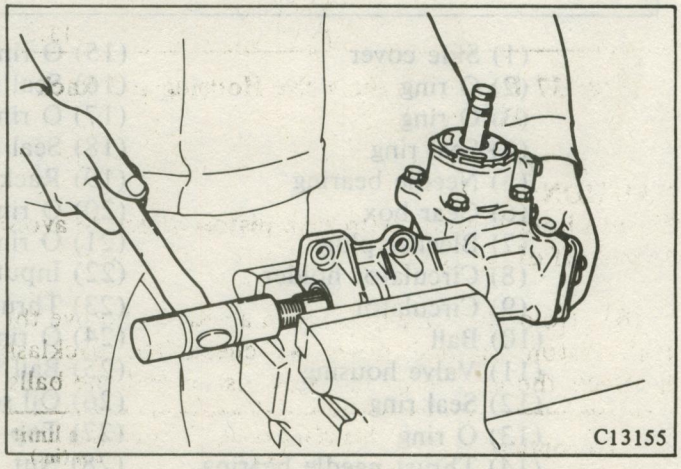


Fig. 55 Removing the Crossshaft

(4) Remove the valve housing nut using Valve Housing Special Spanner (Special Tool MB990852).

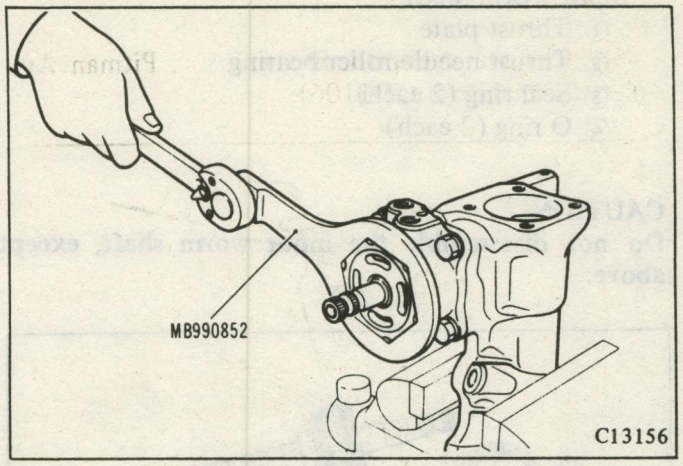


Fig. 56 Removing the Valve Housing Nut

(5) Remove the valve housing bolts and take out the valve housing and rack piston, while holding the rack piston by hand to avoid rotation.

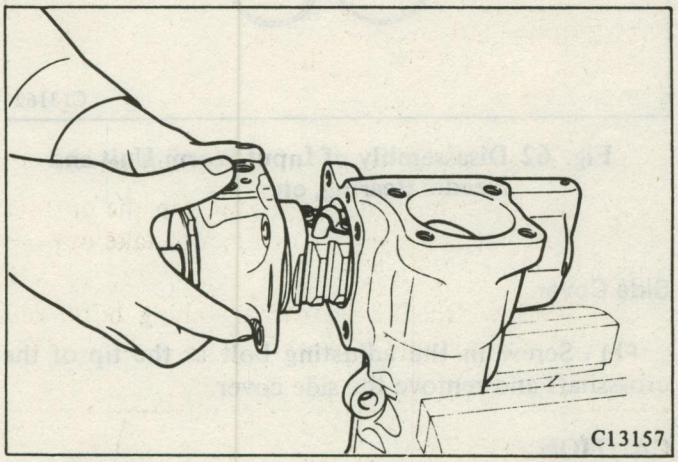


Fig. 57 Removing the Valve Housing and Rack Piston

CAUTION:
Do not hold housing with rack piston down, to avoid falling off of the piston.

(6) Hold the valve housing in a vise, and move the rack piston up and down to check the backlash between the groove of the rack piston and the balls.

Description	Standard value mm (in.)	Service limit mm (in.)
Backlash between the groove of the rack piston and balls	0.05 to 0.1 (.002 to .004)	0.2 (.008)

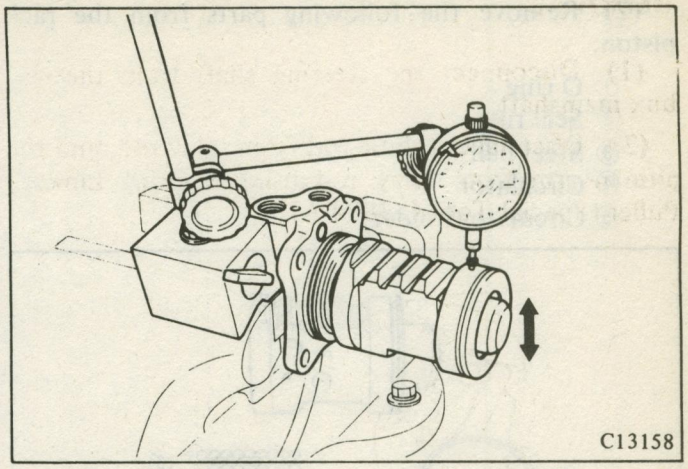


Fig. 58 Measuring Backlash of Gutter and Ball

NOTE: With the rack piston fully tightened and loosened two turns, measure the backlash. If backlash exceeds service limit, replace the ball screw unit and rack piston as an assembly.

Rack Piston

(1) Remove the rack piston by turning it counterclockwise.

CAUTION:
Do not lose balls, twenty-six pieces in all which may drop.

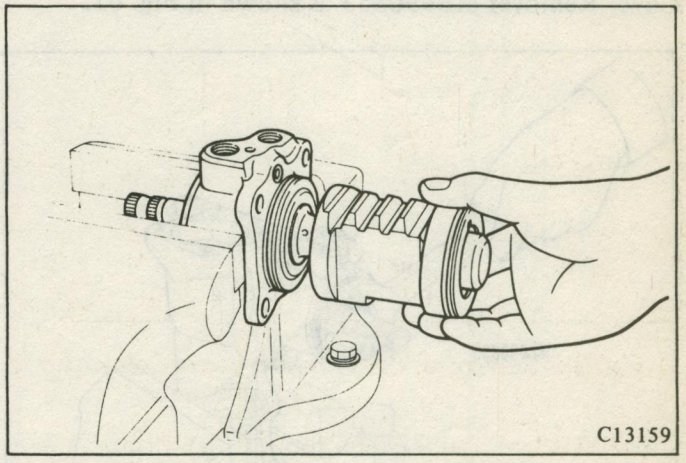


Fig. 59 Removing the Rack Piston

(2) Remove the following parts from the rack piston.

① O ring
② Seal ring
③ Steel ball
④ Circulator
⑤ Circulator holder

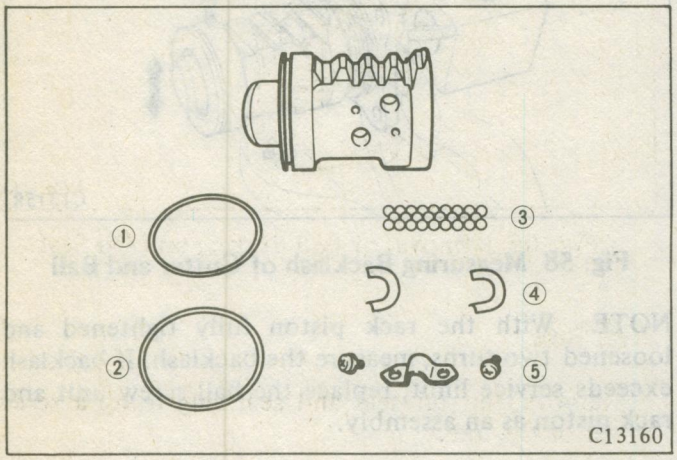


Fig. 60 Removing Circulator, Seal Ring, etc.

CAUTION:
Do not disassemble the end cap of the rack piston.

Input Worm Shaft

(1) Loose the top cover using a special tool Top Cover Remover MB990853 as shown in Fig. 61.

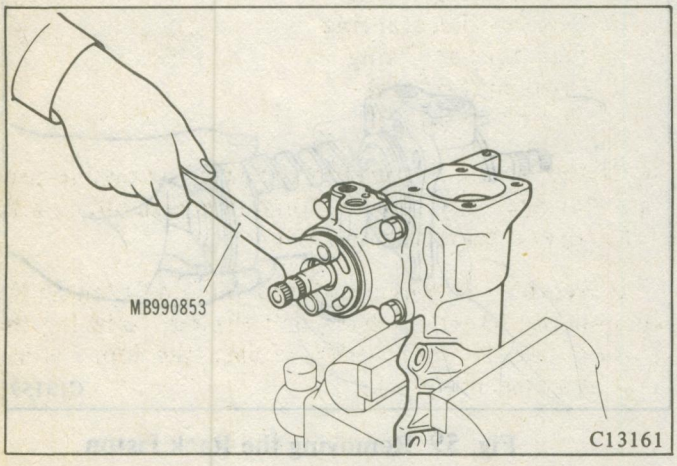


Fig. 61 Removing the Top Cover

Take out the top cover with input worm shaft from valve housing.

(2) Remove the following parts from the input worm shaft and valve housing.

Input Worm Shaft
① Thrust plate
② Thrust needle roller bearing
③ Seal ring (2 each)
④ O ring (2 each)

CAUTION:
Do not disassemble the input worm shaft, except above.

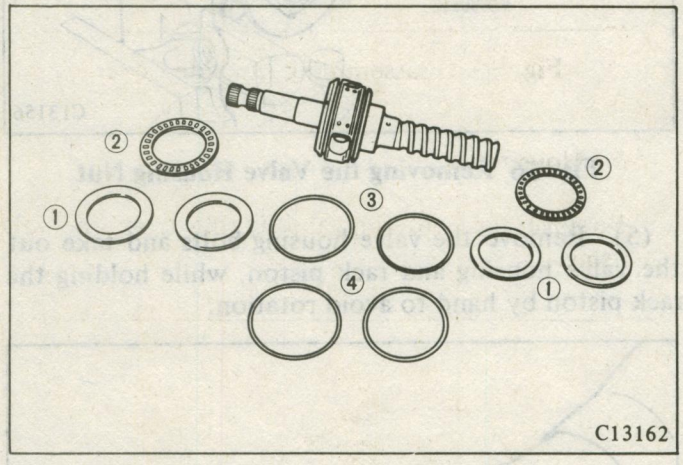


Fig. 62 Disassembly of Input Worm Unit and Needle Bearing, etc.

Side Cover

(1) Screw in the adjusting bolt at the tip of the crossshaft and remove the side cover.

CAUTION:
Do not lose rollers of the needle bearing thirty-three in all that may fall off.

(2) Remove the following parts from the side cover.

① O ring
② Needle bearing
③ Adjusting bolt
④ Adjusting plate

NOTES: 1. Do not disassemble the sealing at the rear of the needle bearing, when no oil leaks from the thread of the adjusting bolt.

2. Do not remove the bleeder plug unless necessary.

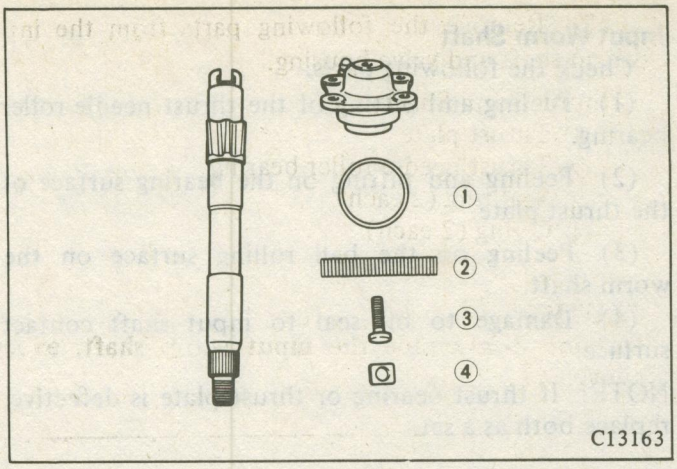


Fig. 63 Disassembling the Side Cover

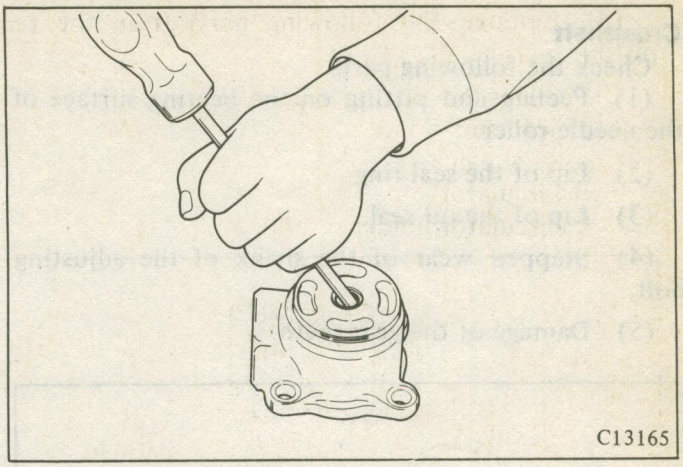


Fig. 65 Removal of Ball Bearing and Oil Seal

Valve Housing

Remove the seal ring and O ring from the valve housing.

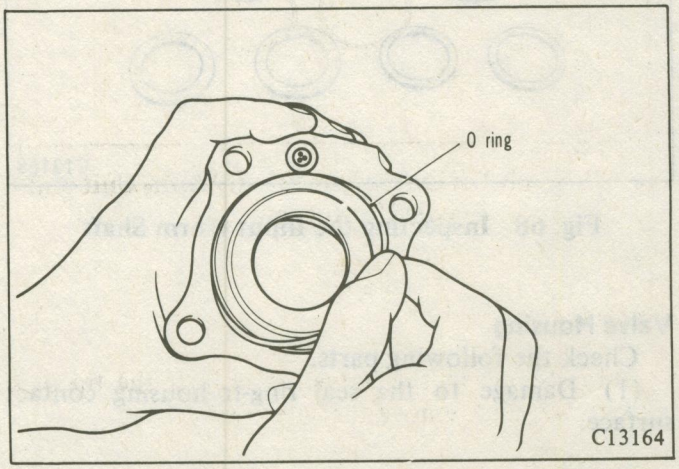


Fig. 64 Removal of Seal Ring and O ring from Valve Housing

Top Cover

(1) Take out the ball bearing and oil seal from the top cover by tapping with a brass bar.

Gear Box

Remove the oil seal and seal ring using a screwdriver or the like.

NOTE: Do not disassemble the needle bearing.

INSPECTION

• Check the following and replace or repair if necessary. Replace the O ring, seal ring and oil seal whenever disassembled.

It is recommended to make provision as follows:

Power steering gear box seal kit
Side cover, O ring
Seal housing O ring
Seal housing seal ring
Seal housing O ring
Crossshaft oil seal
Top cover oil seal

• If the needle bearings in the gear box or side cover are damaged, replace the gear box assembly or the side cover assembly, respectively.

If free play is present around the pin fastening the torsion bar to worm shaft, and the pin fastening the torsion bar to input shaft, replace the input worm unit as an assembly.

Crossshaft

Check the following parts.

(1) Peeling and pitting on the bearing surface of the needle roller.

(2) Lip of the seal ring.

(3) Lip of the oil seal.

(4) Stepped wear of the shank of the adjusting bolt.

(5) Damage of the gear teeth.

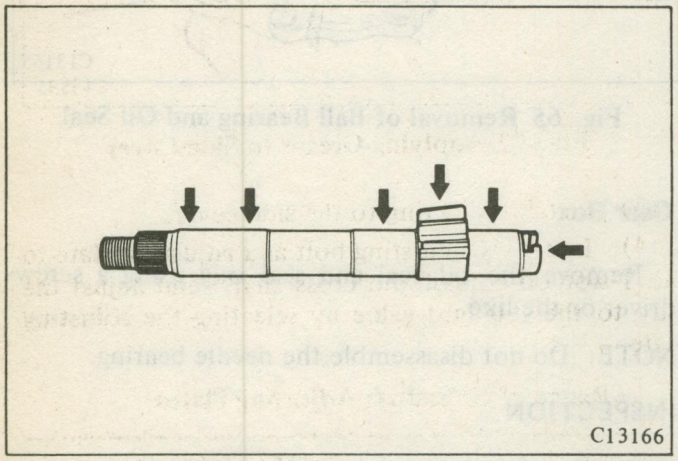


Fig. 66 Inspection Points of the Crossshaft

Rack Piston

Check the following parts.

(1) Damage of the gear teeth.

(2) Peeling and pitting of the groove.

(3) Uneven wear of the rolling surface of the circulator.

(4) Breakage or damage of balls.

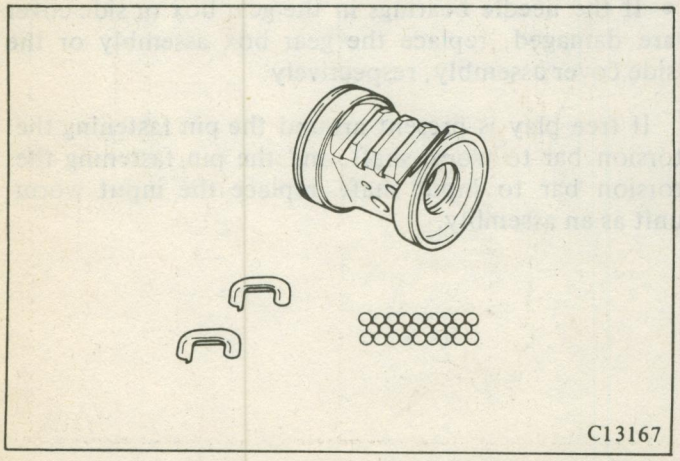


Fig. 67 Inspecting the Rack Piston

Input Worm Shaft

Check the following parts.

(1) Peeling and pitting of the thrust needle roller bearing.

(2) Peeling and pitting on the bearing surface of the thrust plate.

(3) Peeling on the ball rolling surface on the worm shaft.

(4) Damage to oil seal to input shaft contact surface.

NOTE: If thrust bearing or thrust plate is defective, replace both as a set.

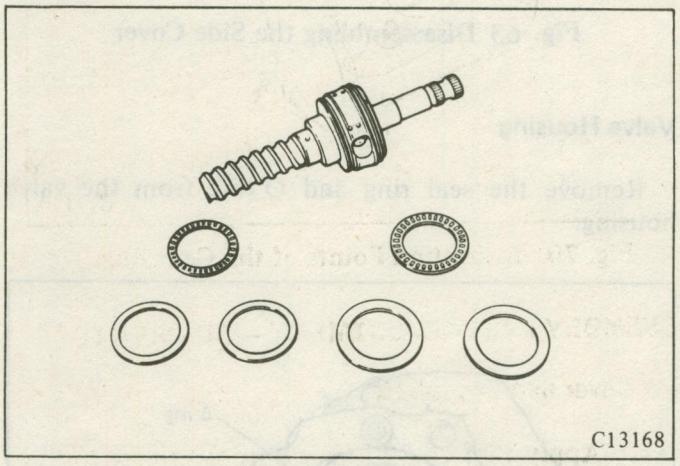


Fig. 68 Inspecting the Input Worm Shaft

Valve Housing

Check the following parts.

(1) Damage to the seal ring-to-housing contact surface.

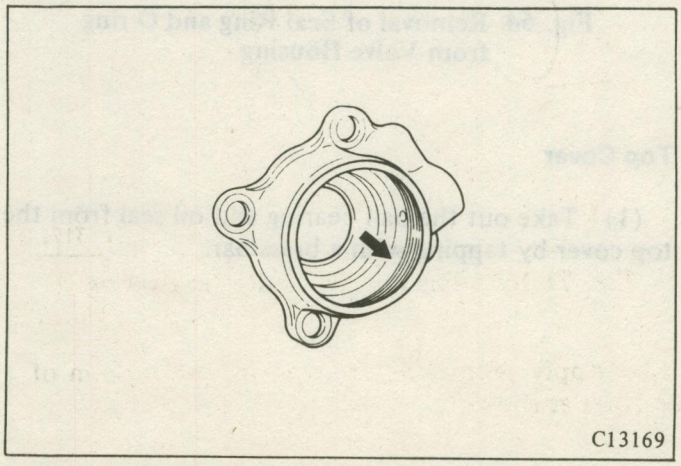


Fig. 69 Inspection Point of the Valve Housing

Gear Box

(1) Damage to the O ring sealing surface of the side cover.

(2) Damage to the O ring sealing surface of the valve housing.

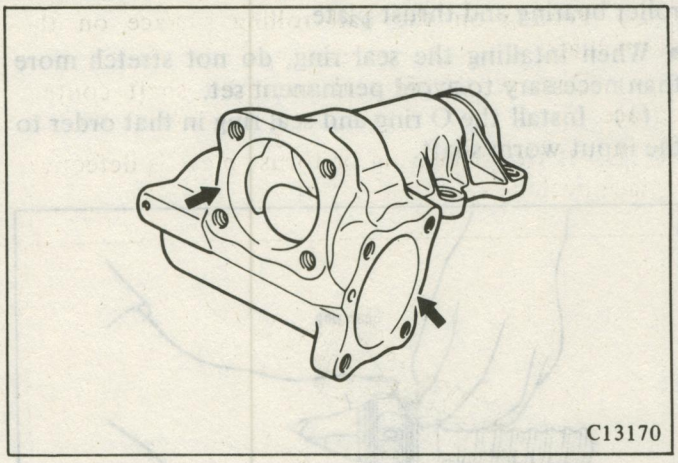


Fig. 70 Inspection Points of the Gear Box

ASSEMBLY AND ADJUSTMENT – SUB PARTS

Side Cover and Crossshaft

(1) Apply thin coat of multipurpose grease to the bearing surface of the needle bearing and install the thirty three of rollers.

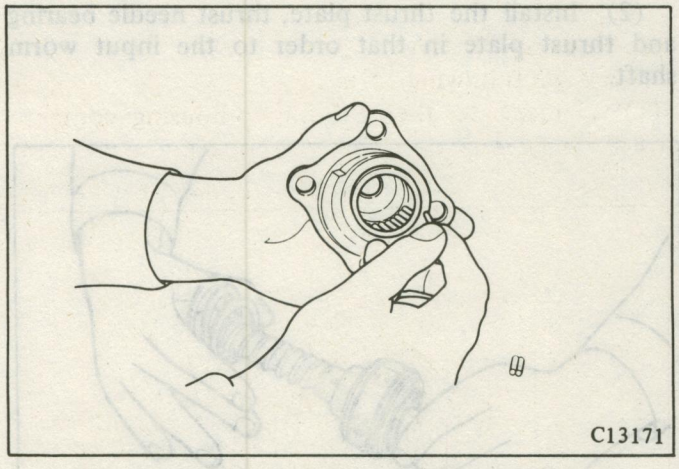


Fig. 71 Installing the Needle Roller Bearing

(2) Apply multipurpose grease to the bottom of side cover as shown.

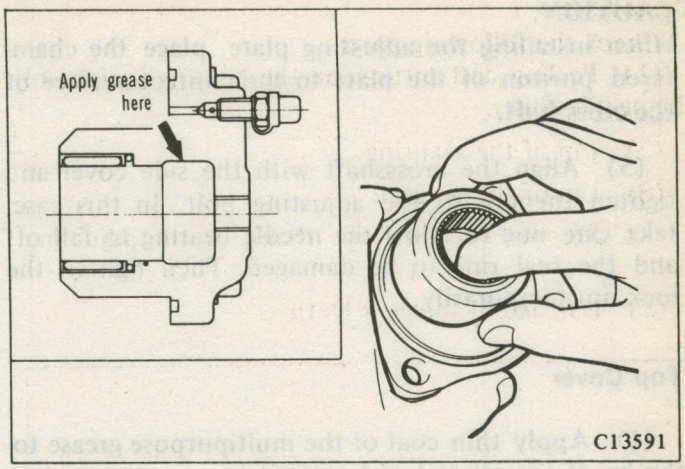


Fig. 72 Applying Grease to Side Cover

(3) Install the O ring to the side cover.

(4) Insert the adjusting bolt and adjusting plate to the T-slot on top of the cross shaft, and adjust the play to the standard value by selecting the adjusting plate.

Range of Crossshaft Adjusting Plates

Part No.	Thickness mm (in.)
MB076596	1.95 (.077)
MB076196	2.00 (.079)
MB076597	2.05 (.081)
MB076598	2.10 (.083)
MB076599	2.15 (.085)

Description	Standard dimension mm (in.)
Crossshaft axial play	0 to 0.05 (0 to .002)

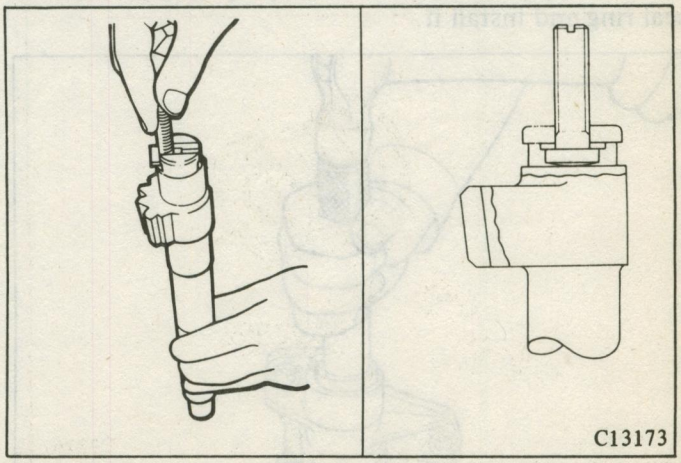


Fig. 73 Adjusting the Crossshaft T-slot

CAUTION:
When installing the adjusting plate, place the chamfered poriton of the plate to the contact surface of the crossshaft.

(5) Align the crossshaft with the side cover and tighten them with the adjusting bolt. In this case, take care not to allow the needle bearing to fall off and the seal ring to be damaged. Then tighten the lock nut temporarily.

Top Cover

(1) Apply thin coat of the multipurpose grease to the lip of the oil seal and press it in.

(2) Press fit the ball bearing.

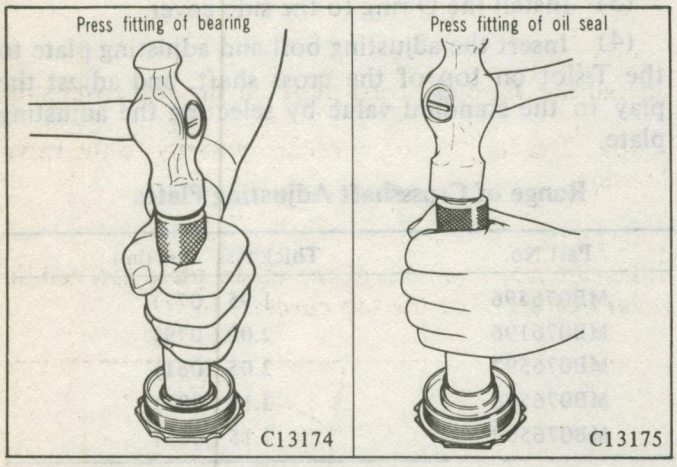


Fig. 74 Press Fitting the Oil Seal and Ball Bearing

Gear Box

(1) Apply thin coat of multipurpose grease to the seal ring and install it.

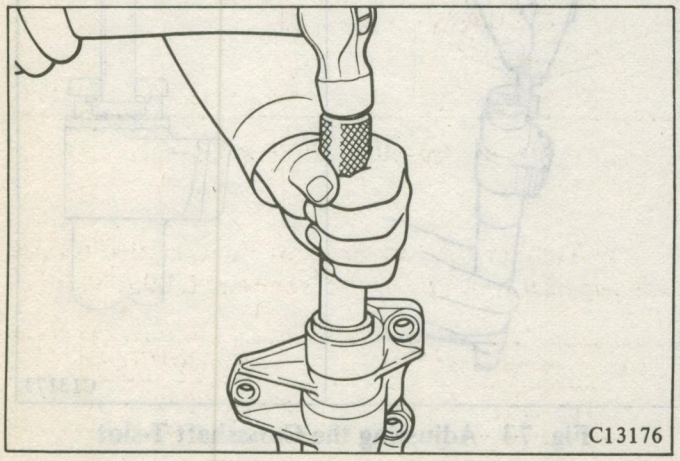


Fig. 75 Press Fitting the Oil Seal

ASSEMBLY AND ADJUSTMENT

During the assembly and adjustment, observe the following.

- Apply thin coat of the recommended automatic transmission fluid to the O ring, seal ring, needle roller bearing and thrust plate.
- When intalling the seal ring, do not stretch more than necessary to avoid permanent set.

(1) Install the O ring and seal ring in that order to the input worm shaft.

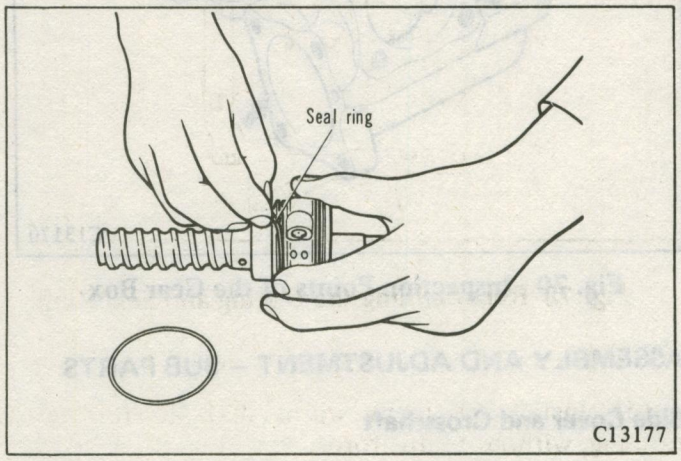


Fig. 76 Installing the O ring and Seal Ring

(2) Install the thrust plate, thrust needle bearing and thrust plate in that order to the input worm shaft.

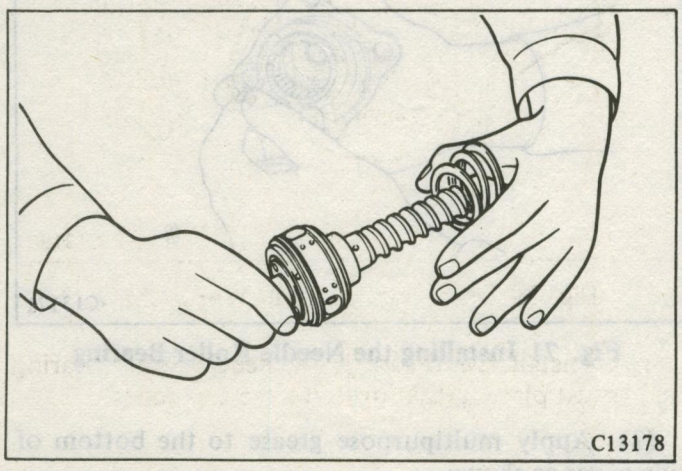


Fig. 77 Installing the Thrust Plate and Thrust Needle Bearing

(3) Install the O ring and seal ring into the groove of valve housing without undue force.

CAUTION:
Install the seal ring, as compressed into a heart shape.

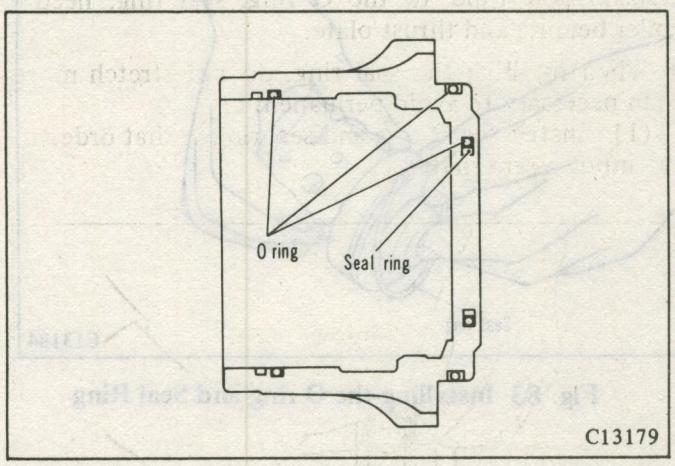


Fig. 78 Reassembling the O Ring and Seal Ring

(4) Install the input worm shaft to the valve housing, without undue force.

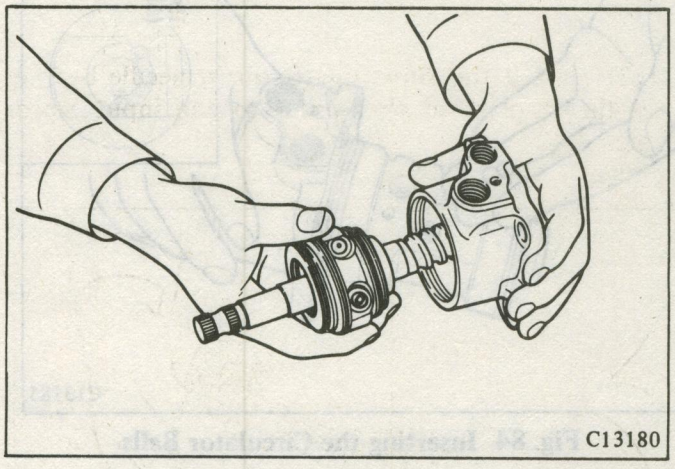


Fig. 79 Installing the Input Worm Shaft

(5) Install the thrust plate, needle roller bearing and thrust plate in that order to the top cover.

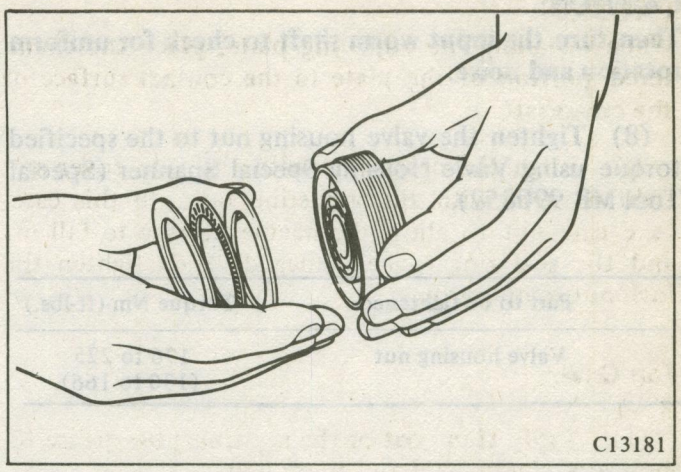


Fig. 80 Reassembling the Thrust Plate and Needle Roller Bearing

CAUTION:
Install the thinner thrust plate on the top cover side.

(6) Tighten the top cover temporarily to the valve housing.

CAUTION:
Take care not to be out of the thrust plate and neddle roller bearing from the top cover.

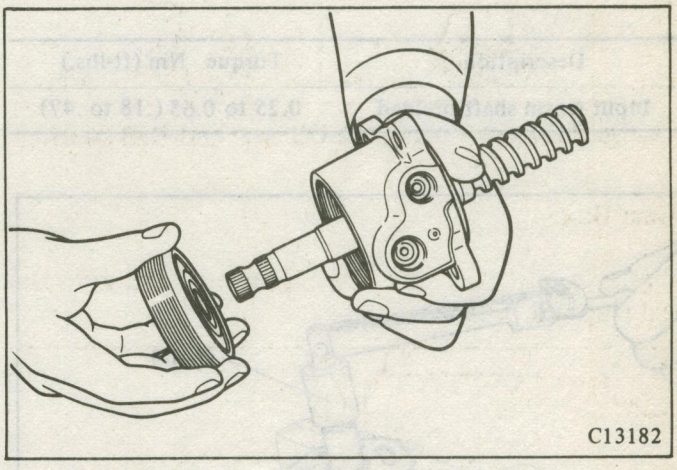


Fig. 81 Installing the Top Cover

(7) Tighten the top cover to the specified torque using special tool Top Cover Remover MB990853.

Part to be tightened	Torque Nm (ft-lbs.)
Top cover	1.0 to 1.4 (.72 to 1.01)

CAUTION:
Then turn the input worm shaft to check for uniform rotation and noise.

(8) Tighten the valve housing nut to the specified torque using Vavle Housing Special Spanner (Special Tool MB 990852).

Part to be tightened	Torque Nm (ft-lbs.)
Valve housing nut	176 to 225 (130 to 166)

CAUTION:
- **Take care not to allow the top cover to rotate.**
- **Finally tighten the valve housing nut at the time of the measurement of the total starting torque because of the great torque required.**

(9) Measure the starting torque by using Preload Socket (Special Tool CT-1108) while turning the input worm shaft, and make certain that the preload is within the standard value. Readjust if necessary by loosening the valve housing nut, and in accordance with steps (7) and (8).

Description	Torque Nm (ft-lbs.)
Input worm shaft preload	0.25 to 0.65 (.18 to .47)

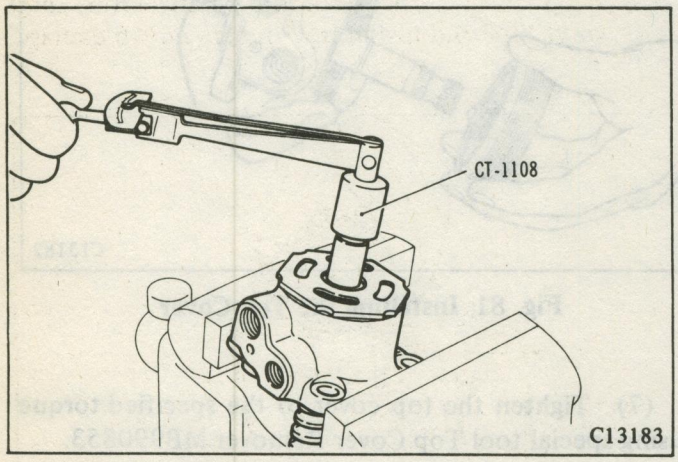


Fig. 82 Measuring the Input Worm Shaft Preload

(10) Install the O ring and seal ring to the rack piston in this order without undue force.

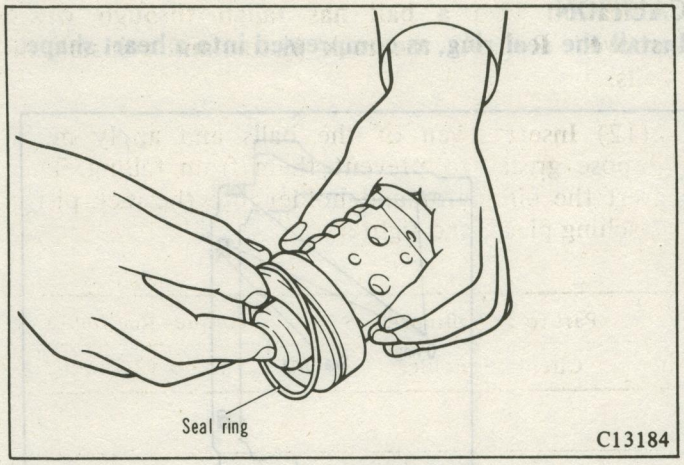


Fig. 83 Installing the O ring and Seal Ring

(11) Insert the rack piston into the input worm shaft until the piston touches the worm shaft end. Then rotate the input worm shaft, and align the ball running surface with the ball insertion hole. Insert 19 balls into the hole, pushing lightly with a brass rod.

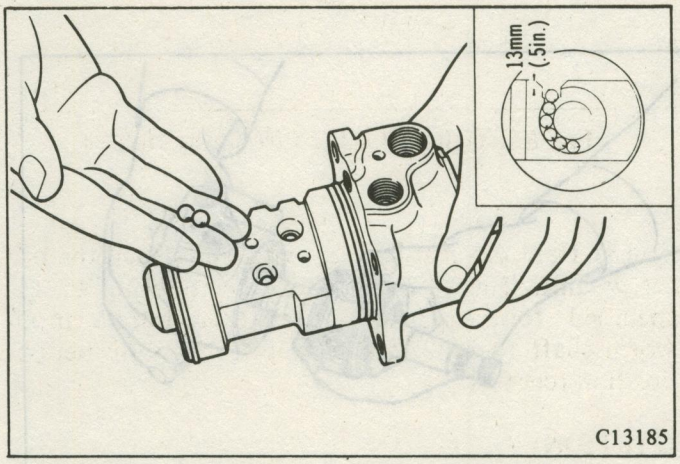


Fig. 84 Inserting the Circulator Balls

CAUTIONS:
- **Do not rotate the input worm shaft and rack piston. The balls may enter another grooves.**

• **After the installation of all of the balls, make sure the entire set of balls reaches about 13 mm (.5 in.) below the end of rack piston. More clearance is an indication that a ball has fallen through wrong groove. Remove the rack piston and reinstall the balls.**

(12) Insert seven of the balls and apply multi-purpose grease to prevent them from falling. Then insert the circulator and holder into the rack piston attaching place, and tighten.

Part to be tightened	Torque Nm (ft-lbs.)
Circulator holder	3.5 to 4.4 (2.5 to 3.3)

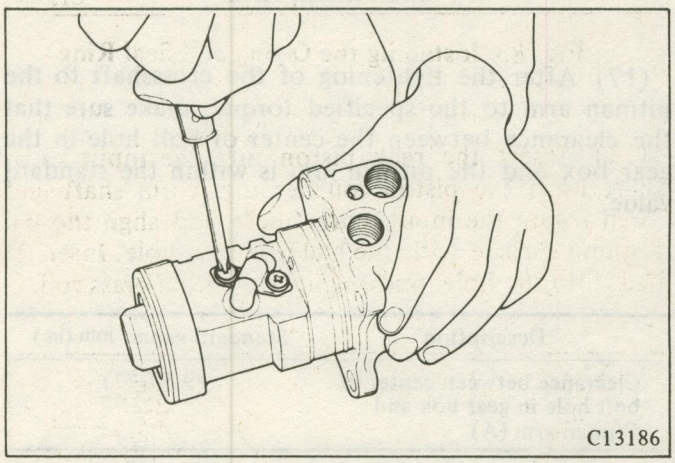


Fig. 85 Tightening the Circulator Holder

(13) Hold the gear box in a vise, and install the ball screw unit. Then tighten the valve housing to the specified torque. After installation, rotate input worm shaft to move the rack piston to the neutral position (center).

CAUTION:
Do not force the rack piston into gear box, to protect the seal ring from damage by the edge of the gear box.

Part to be tightened	Torque Nm (ft-lbs.)
Valve housing	44 to 54 (33 to 40)

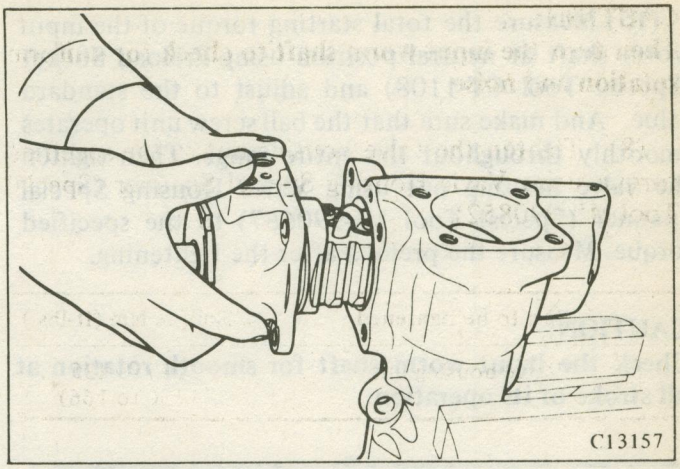


Fig. 86 Installing the Ball Screw Unit

(14) Install the crossshaft assembly (with side cover) to the gear box and tighten the side cover to the specified torque.

Part to be tightened	Torque Nm (ft-lbs.)
Side cover	44 to 54 (33 to 40)

CAUTION:

• When installing the crossshaft, apply thin coat of ATF to the teeth and shaft of the rack piston and multipurpose grease to the oil seal lip.

• Do not rotate the side cover for installation to protect O ring from possible damage.

• Wrap around the serration of the cross shaft with vinyl tape and install it with care not to damage.

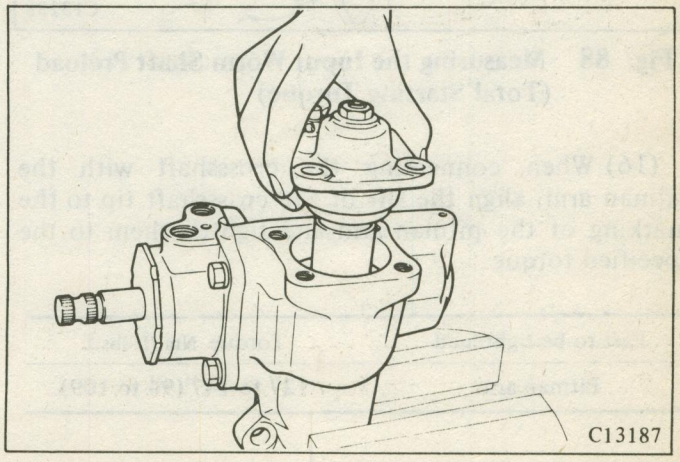


Fig. 87 Installing the Crossshaft

(15) Measure the total starting torque of the input worm shaft at neutral position using Preload Socket (Special Tool CT-1108) and adjust to the standard value. And make sure that the ball screw unit operates smoothly throughout the entire range. Then tighten the valve housing nut using Valve Housing Special Spanner (Special Tool MB990667) to the specified torque. Measure the preload after the tightening.

CAUTION:
Check the input worm shaft for smooth rotation at all stroke of its operation.

Description	Starting torque Nm (in-lbs.)
Total starting torque of the input shaft (neutral)	0.5 to 0.9 (.36 to .65)

Part to be tightened	Torque Nm (ft-lbs.)
Valve housing nut	176 to 225 (130 to 166)

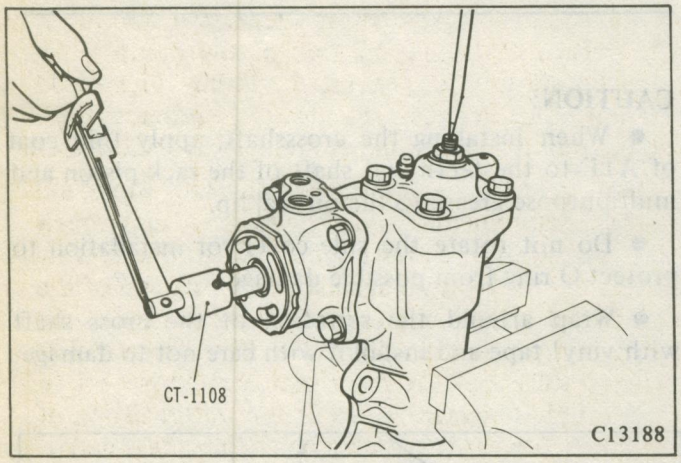


Fig. 88 Measuring the Input Worm Shaft Preload (Total Starting Torque)

(16) When connecting the crossshaft with the pitman arm, align the slit of the crossshaft tip to the marking of the pitman arm and tighten them to the specified torque.

Part to be tightened	Torque Nm (ft-lbs.)
Pitman arm	127 to 147 (94 to 109)

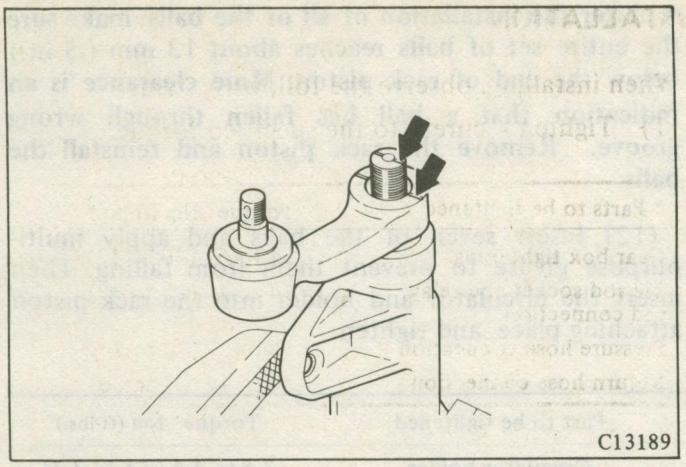


Fig. 89 Connecting the Crossshaft and Pitman Arm

(17) After the tightening of the crossshaft to the pitman arm to the specified torque, make sure that the clearance between the center of bolt hole in the gear box and the pitman arm is within the standard value.

Description	Standard value mm (in.)
Clearance between center of bolt hole in gear box and Pitman arm (A)	19.5 (.77)

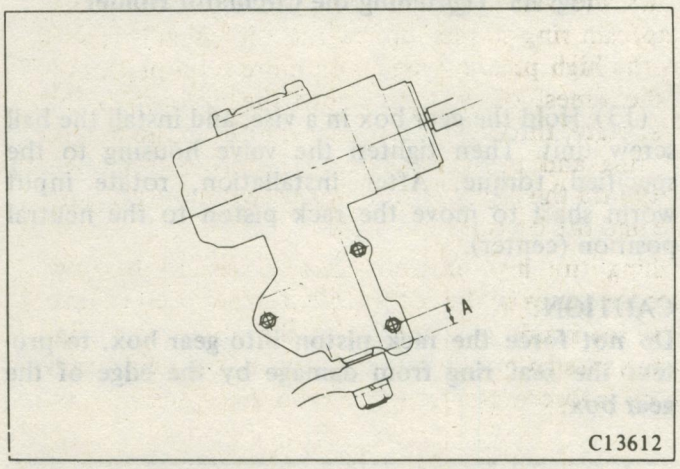


Fig. 90 Setting Position of Pitman Arm

INSTALLATION

When installing, observe the following items:

(1) Tighten securely to the specified torque.

Parts to be tightened	Torque Nm (ft-lbs.)
Gear box tightening	54 to 64 (40 to 47)
Tie rod socket and relay rod connection	34 to 44 (25 to 33)
Pressure hose connection	30 to 39 (22 to 29)
Return hose connection	39 to 49 (29 to 36)

(2) Fill reservoir with ATF and air bleed. (Refer to Inspection and Adjustment.)

(3) Start the engine and operate at 2000 rpm for five minutes and inspect for fluid leaks.

NOTES: 1. When disassembling the gear box, make sure to check the oil pressure to verify the normal operation. (Refer to Inspection and Adjustment.)

2. Install the pressure hose and return hose with care not to be twisted or interfere with adjacent parts.

OIL PUMP

OIL PUMP

General Information

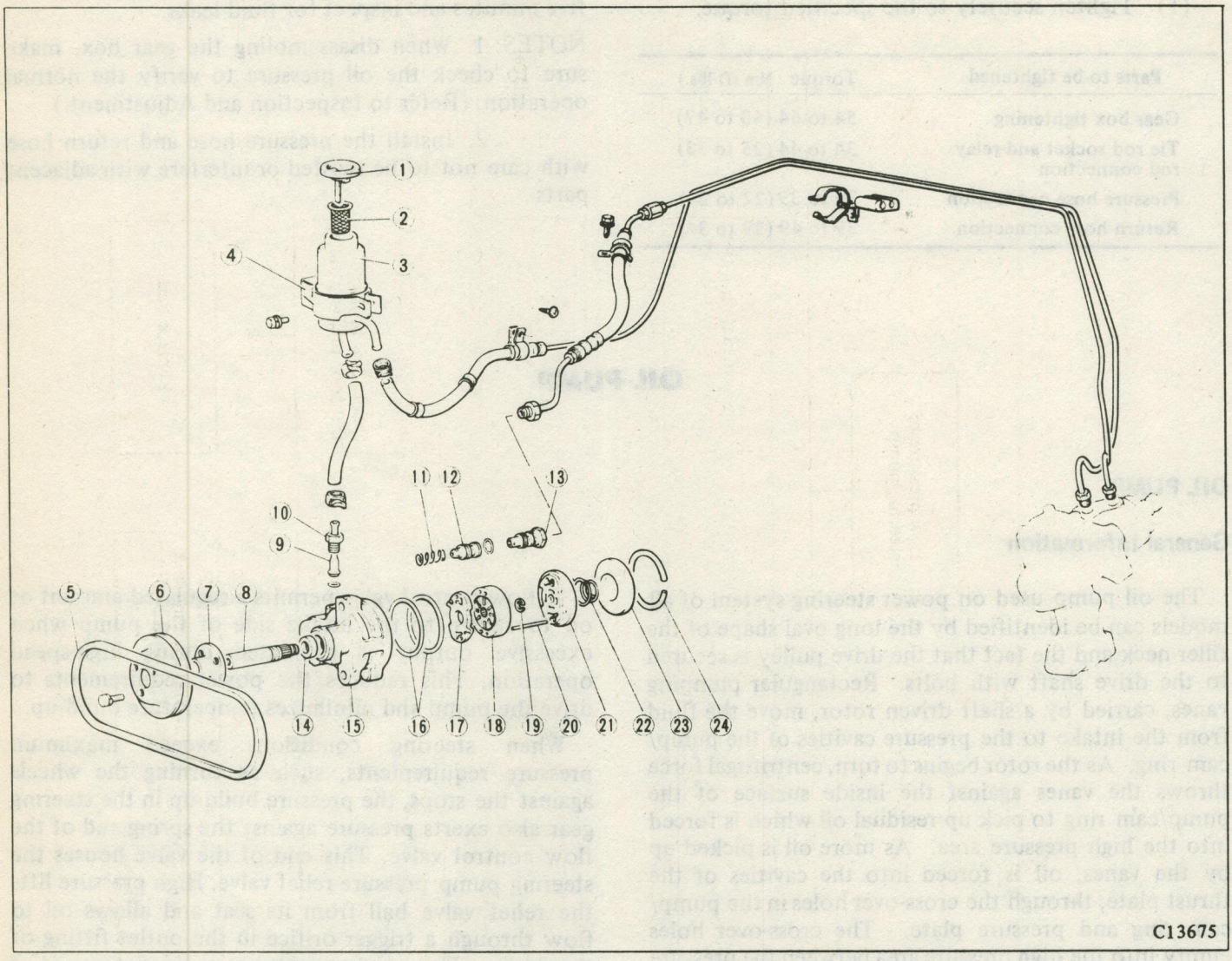
The oil pump used on power steering system of all models can be identified by the long oval shape of the filler neck and the fact that the drive pulley is secured to the drive shaft with bolts. Rectangular pumping vanes, carried by a shaft driven rotor, move the fluid from the intake to the pressure cavities of the pump/cam ring. As the rotor begins to turn, centrifugal force throws the vanes against the inside surface of the pump/cam ring to pick up residual oil which is forced into the high pressure area. As more oil is picked up by the vanes, oil is forced into the cavities of the thrust plate, through the cross-over holes in the pump/cam ring and pressure plate. The cross-over holes empty into the high pressure area between the pressure plate and the housing end plate.

Filling the high-pressure area causes oil to flow under the vanes in the rotor slots, forcing the vanes to follow the inside oval surface of the pump/cam ring. As the vanes rotate to the small area of the pump/cam ring, oil is forced out from between the vanes.

A flow control valve permits a regulated amount of oil to return to the intake side of the pump when excessive output is generated during high-speed operation. This reduces the power requirements to drive the pump and minimizes temperature build-up.

When steering conditions exceed maximum pressure requirements, such as turning the wheels against the stops, the pressure build-up in the steering gear also exerts pressure against the spring end of the flow control valve. This end of the valve houses the steering pump pressure relief valve. High pressure lifts the relief valve ball from its seat and allows oil to flow through a trigger orifice in the outlet fitting of the pump. This reduces pressure on the spring end of the valve which then opens and allows the oil to return to the intake side of the pump. This action limits maximum pressure output of the pump to a safe level. Under normal operating conditions, the pressure requirements of the pump are below maximum, causing the pressure relief ball and the flow control valve to remain closed.

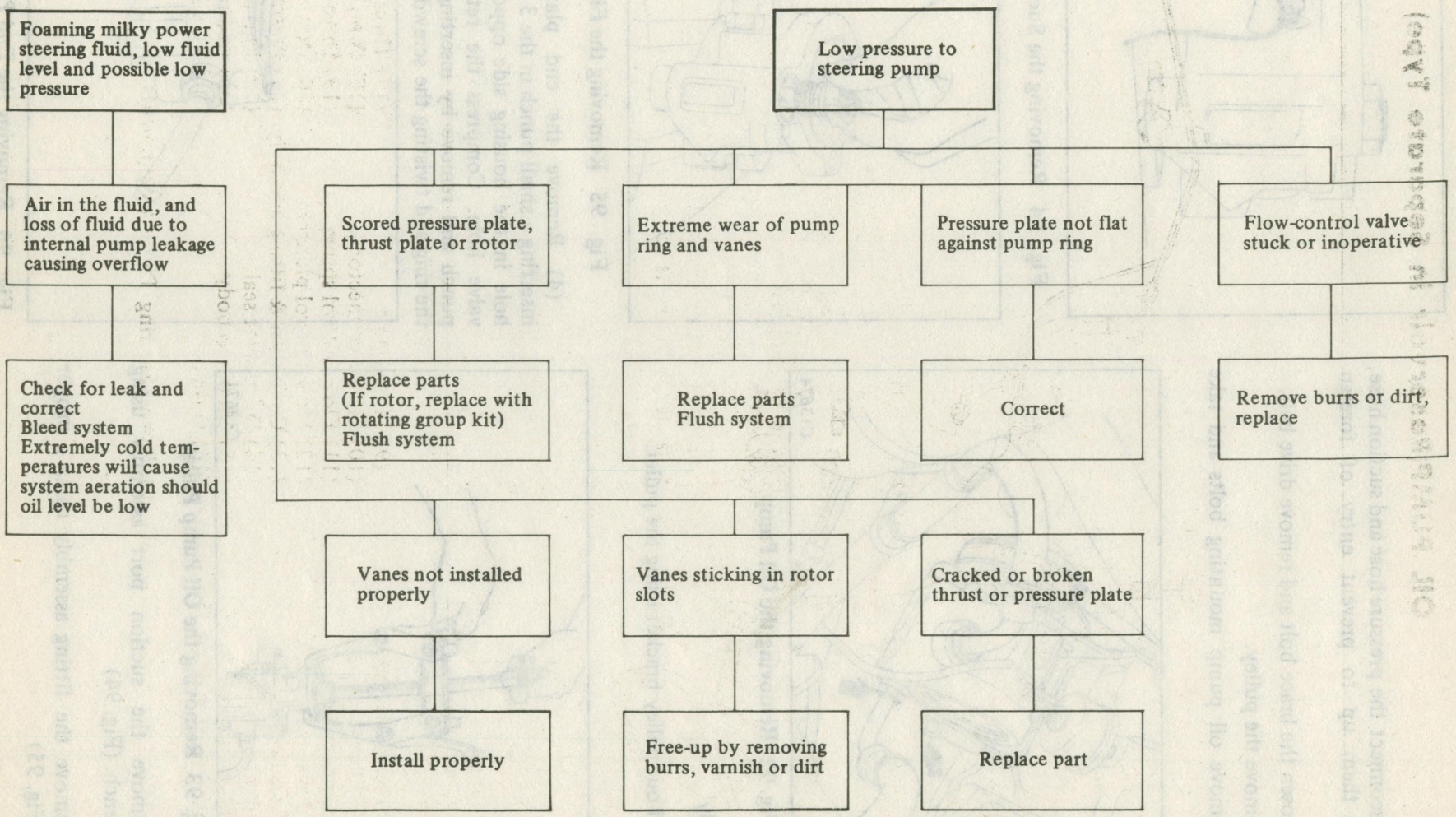
OIL PUMP(Reservoir in Separate Type)



(1) Oil resorvoir cap
(2) Oil filter
(3) Oil resorvoir
(4) Oil resorvoir bracket
(5) Drive belt
(6) Oil pump pulley
(7) Pulley bracket
(8) Drive shaft
(9) Fitting pipe
(10) Fitting connector
(11) Flow control spring
(12) Flow control plunger
(13) Connector & fitting assembly
(14) Drive shaft seal
(15) Oil pump body
(16) O ring
(17) Thrust plate
(18) Pump ring & rotor
(19) Drive shaft retaining ring
(20) Dowel
(21) Pressure plate
(22) End plate spring
(23) End plate
(24) Retaining ring

Fig. 91 Power Steering Pump Components

Diagnostic Chart



Removal

(1) Disconnect the pressure hose and suction hose, and plug them up to prevent entry of foreign material.

(2) Loosen the brace bolt and remove drive belt.

(3) Remove the pulley.

(4) Remove oil pump mounting bolts and take out pump.

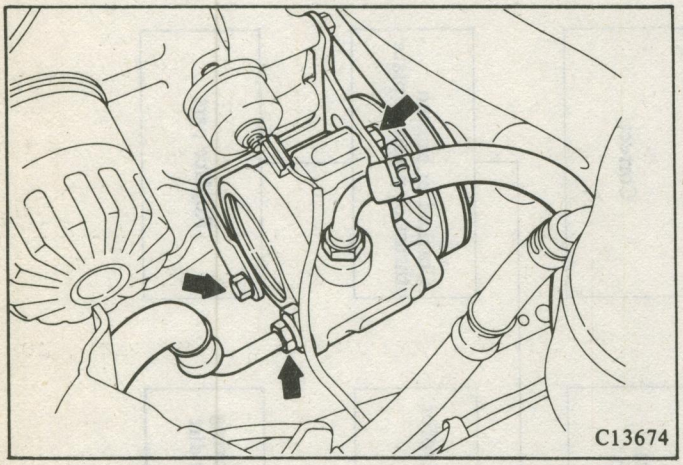


Fig. 92 Removing the Oil Pump

Disassembly

(1) Pull out pulley bracket using the puller.

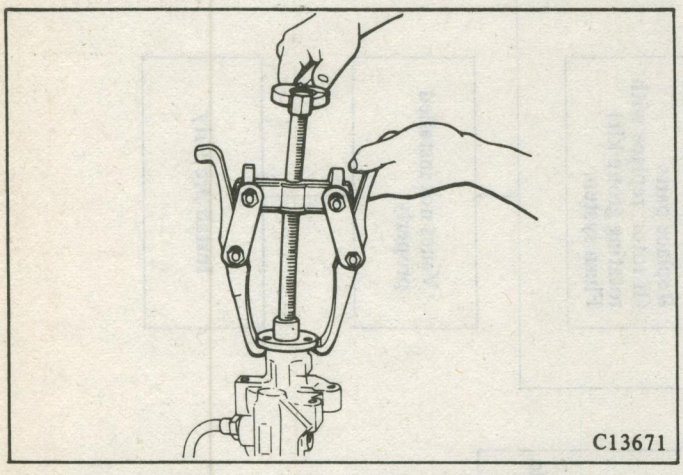


Fig. 93 Removing the Oil Pump Pulley

(2) Remove the suction port assembly using proper wrench. (Fig. 94)

(3) Remove the fitting assembly using a proper wrench. (Fig. 95)

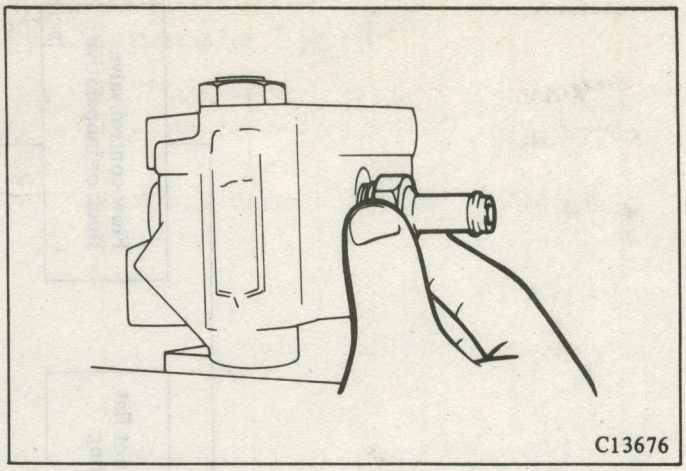


Fig. 94 Removing the Suction Port Assembly

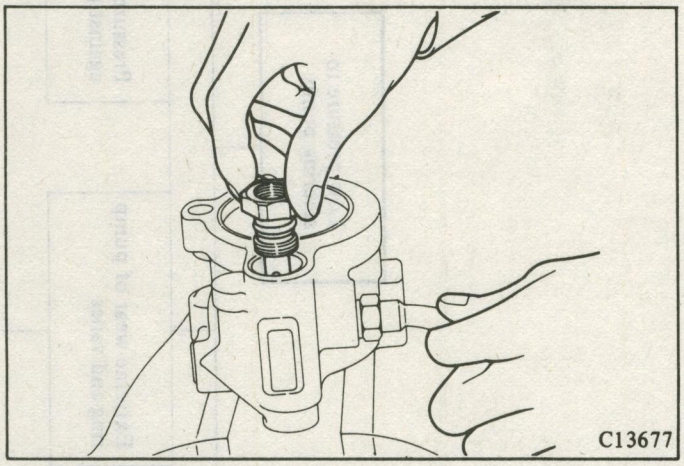


Fig. 95 Removing the Fitting Assembly

(4) Remove the end plate retaining ring by inserting a small punch in the 3 mm (.13 in.) diameter hole in the housing side opposite the flow control valve hole. Compress the retaining ring with the punch and remove by inserting a screwdriver under the ring and twisting the screwdriver. (Fig. 96)

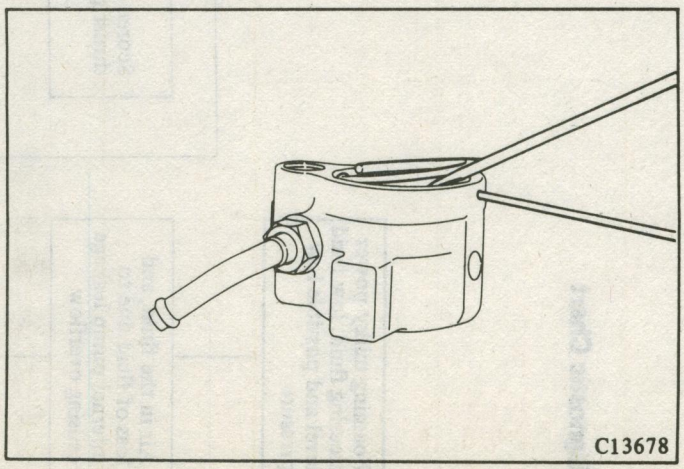


Fig. 96 Removing the End Plate Retaining Ring

(5) Remove end plate and end plate O ring. End plate is spring loaded and will generally sit above the housing level for ease of removal. If sticking should occur, a slight rocking action of the end plate should be used to free it. (Fig. 97)

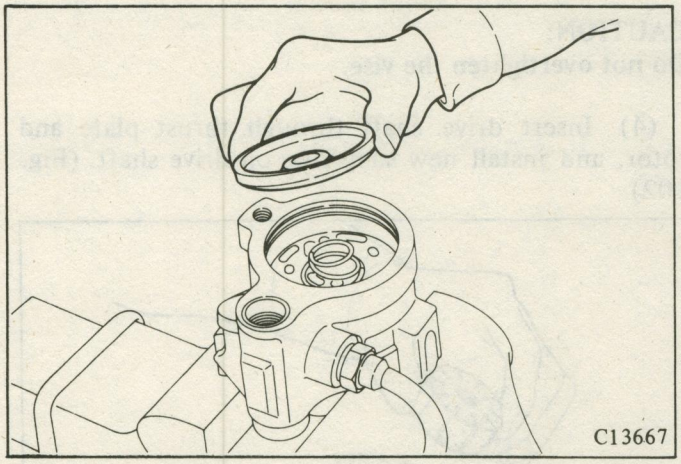


Fig. 97 End Plate and Spring

(6) Remove pump from vise and invert. Flow control valve and valve spring will fall free. (Fig. 98)

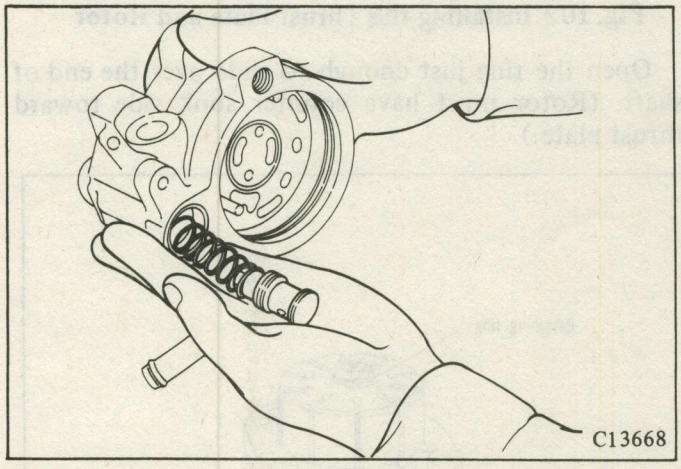


Fig. 98 Removing the Flow Control Valve

(7) With end cover O ring removed, tap very lightly on end of drive shaft with plastic hammer, only until pressure plate falls free. (Fig. 99)

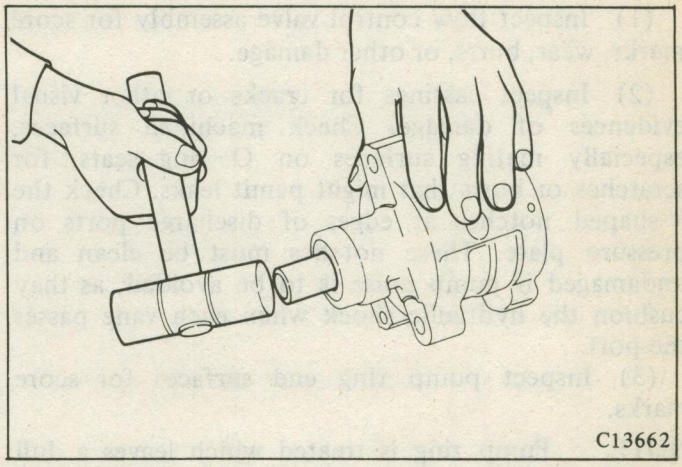


Fig. 99 Unseating Pressure Plate

(8) Remove pressure plate, drive shaft, pump ring, vanes and rotor

CAUTION:
Do not remove the welch plug. If cracked or dislodged, replace body.

(9) Remove drive shaft retaining ring and discard.

(10) Remove rotor and thrust plate from drive shaft and both dowel pins from housing. (Fig. 100)

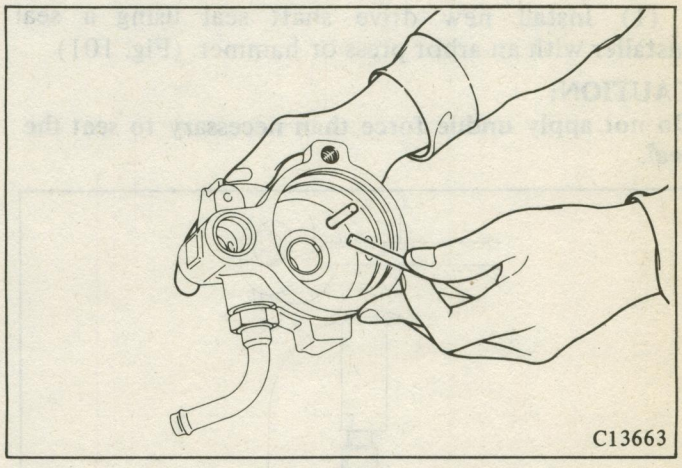


Fig. 100 Removing the Dowel Pins

(11) Pry drive shaft seal out of housing, being careful not to damage the housing bore; discard the shaft seal.

Cleaning and Inspection

Carefully clean all pump parts in cleaning solvent. Replace any damaged or worn parts.

(1) Inspect flow control valve assembly for score marks, wear, burrs, or other damage.

(2) Inspect castings for cracks or other visual evidences of damage. Check machined surfaces, especially mating surfaces on O ring seats, for scratches or burrs that might pemit leaks. Check the V-shaped notches at edges of discharge ports on pressure plate. These notches must be clean and undamaged if pump noise is to be avoided, as they cushion the hydraulic shock when each vane passes the port.

(3) Inspect pump ring end surfaces for score marks.

NOTE: Pump ring is treated which leaves a dull gray-black finish on wear surface. Wavy grain appearance inside pump ring is normal.

(4) Inspect drive shaft for score marks, excessive wear, or damage—particularly at seal surfaces. Separate and inspect rotor and vanes for wear and general condition.

(5) Inspect shaft bushing in pump housing, and replace pump housing if bushing is scored or excessively worn.

(6) If any internal parts are found to be worn or damaged, flush steering gear or disassemble gear and clean internal parts.

Assembly

(1) Install new drive shaft seal using a seal installer with an arbor press or hammer. (Fig. 101)

CAUTION:
Do not apply undue force than necessary to seat the seal.

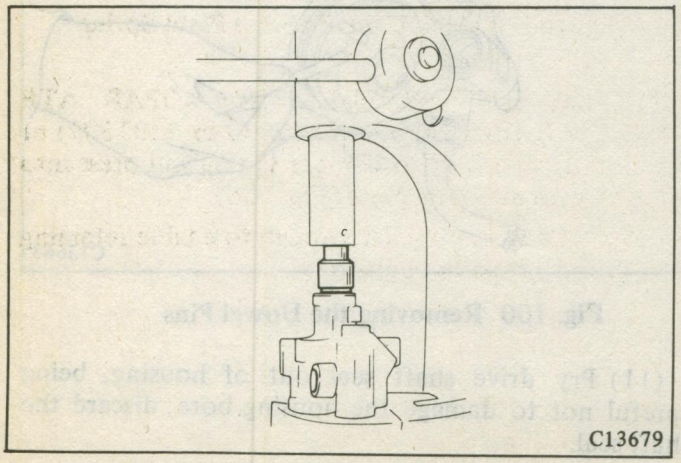


Fig. 101 Installing the Shaft Seal

(2) Lubricate new pressure plate O ring with MOPAR ATF DEXRON II (Part Number 3549660 or 4131509) or equivalent, and install in third groove from rear of housing.

(3) Hold end hub of housing in vise and insert both dowel pins.

CAUTION:
Do not overtighten the vise.

(4) Insert drive shaft through thrust plate and rotor, and install new snap ring on drive shaft. (Fig. 102)

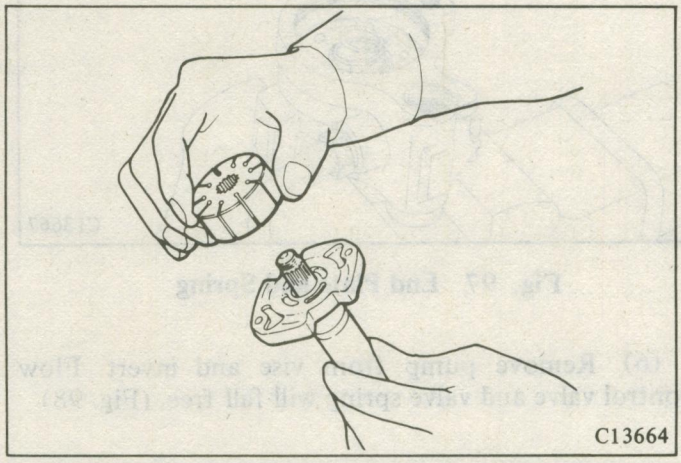


Fig. 102 Installing the Thrust Plate and Rotor

Open the ring just enough to slide over the end of shaft. (Rotor must have counter sunk side toward thrust plate.)

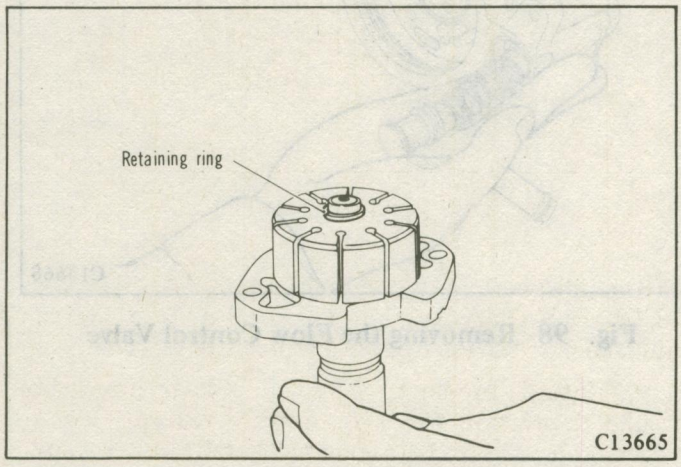


Fig. 103 Shaft and Thrust Plate Assembly

(5) Lubricate oil seal and drive shaft with MOPAR ATF DEXRON II (Part Number 3549660 or 4131509) or equivalent and insert drive shaft in housing, making sure thrust plate slides properly on dowel pins so as not to damage the oil seal lip.

(6) Install pump ring on dowel pins with the arrow toward rear of housing. (Fig. 104)

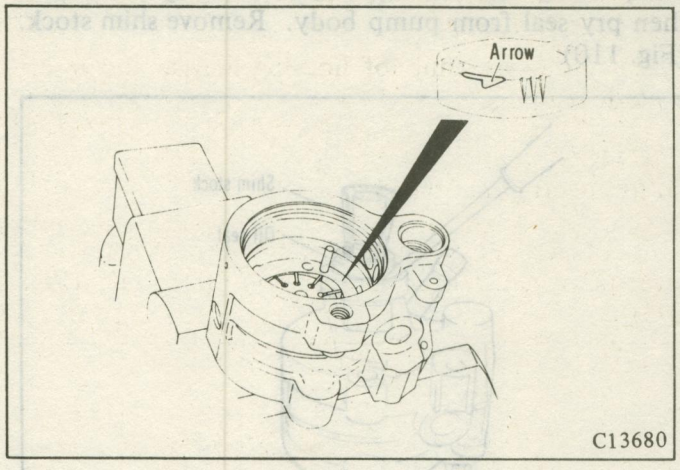


Fig. 104 Installing the Pump Ring

(7) Install all ten vanes in rotor slots with rounded edge of vanes outward. Vanes should slide freely in rotor. (Fig. 105)

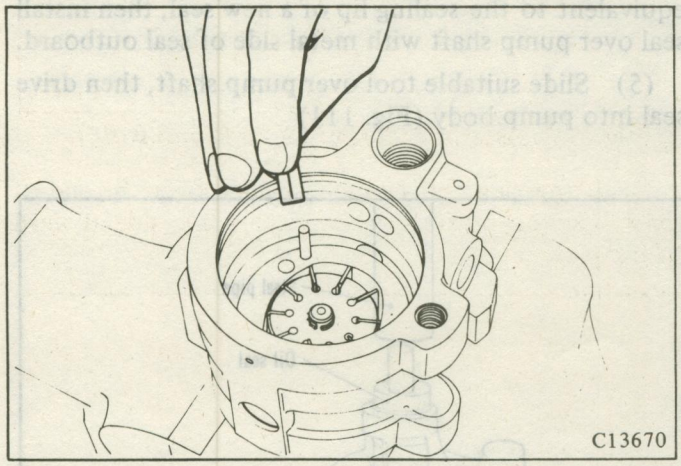


Fig. 105 Installing Vanes

(8) Lubricate pressure plate with MOPAR ATF DEXRON II (Part Number 3549660 or 4131509) or equivalent, so as not to damage pressure plate O ring.

(9) Install pressure plate on dowel pins with circular depression for spring toward rear of housing. Pressure plate must be pressed about 1.6 mm (.06in.) over the O ring to seat. (Fig. 106)

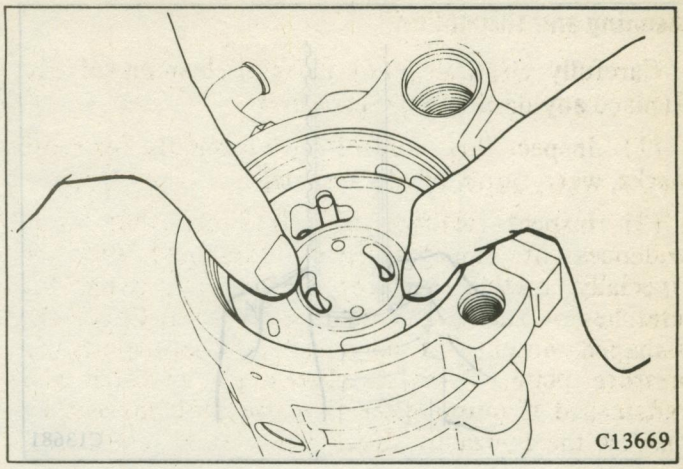


Fig. 106 Installing the End Plate

(10) Lubricate new end plate O ring with MOPAR ATF DEXRON II (Part Number 3459660 or 4131509) or equivalent, and install in second groove from rear of housing.

(11) Install end plate spring in groove provided in pressure plate. (Fig. 107)

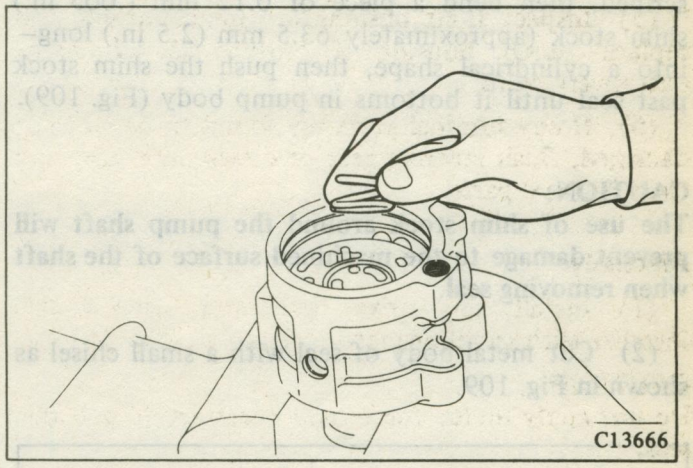


Fig. 107 Installing the Pressure Plate Spring

(12) Lubricate end plate with MOPAR ATF DEXRON II (Part Number 3459660 or 4131509) or equivalent, so as not to damage O ring and press into housing with an arbor press (Fig. 108).

NOTE: Depress only far enough to enable retaining ring to seat properly in groove.

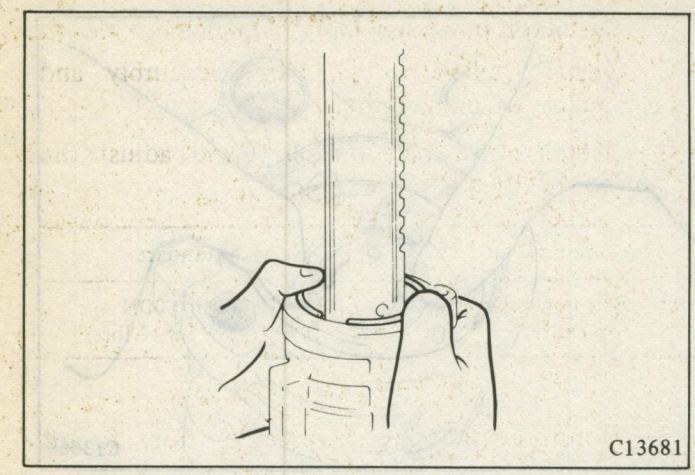


Fig. 108 Installing End Cover Retaining Ring

Drive shaft Seal Replacement (Without Disassembling Pump)

The pump shaft oil seal can be replaced without disassembling the pump as follows:

(1) Remove the pump pulley as previously described, then bend a piece of 0.12 mm (.005 in.) shim stock (approximately 63.5 mm (2.5 in.) long– into a cylindrical shape, then push the shim stock past seal until it bottoms in pump body (Fig. 109).

CAUTION:
The use of shim stock around the pump shaft will prevent damage to the machined surface of the shaft when removing seal.

(2) Cut metal body of seal with a small chisel as shown in Fig. 109.

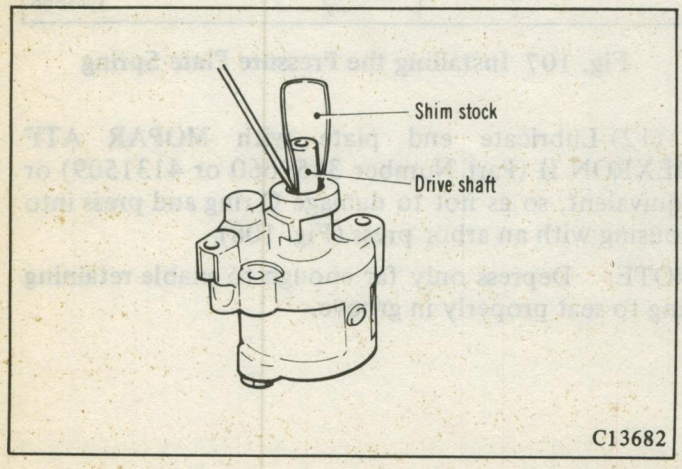


Fig. 109 Cutting the Drive Shaft Seal

(3) Tear metal body approximately 25 mm (1 in.) with diagonals. Force an awl between the pump body and the O.D. seal to collapse the seal, then pry seal from pump body. Remove shim stock. (Fig. 110)

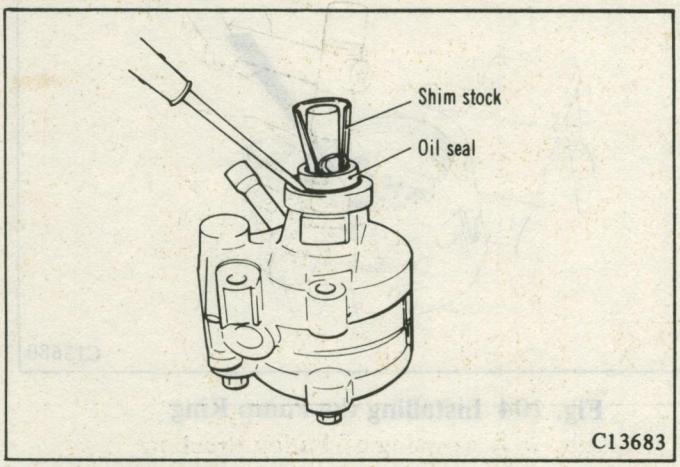


Fig. 110 Removing the Drive Shaft Seal

(4) Apply special seal lubricant No. 1050169 or equivalent to the sealing lip of a new seal, then install seal over pump shaft with metal side of seal outboard.

(5) Slide suitable tool over pump shaft, then drive seal into pump body (Fig. 111)

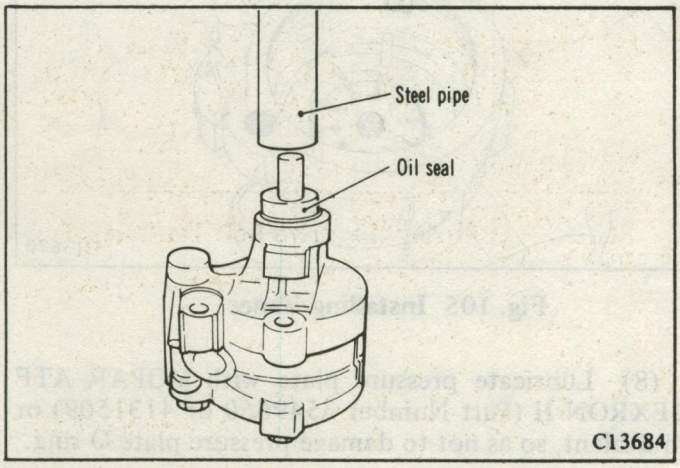


Fig. 111 Installing the Drive Shaft Seal

(6) Install pump pulley.

Installation

(1) Press fit pulley bracket onto drive shaft.

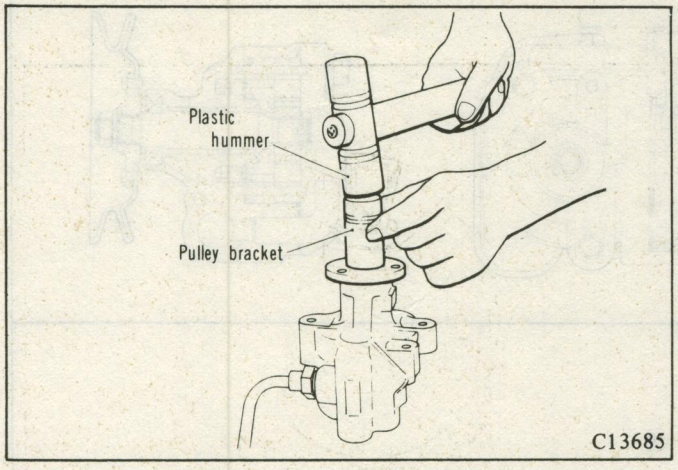


Fig. 112 Pressing of Pulley Bracket

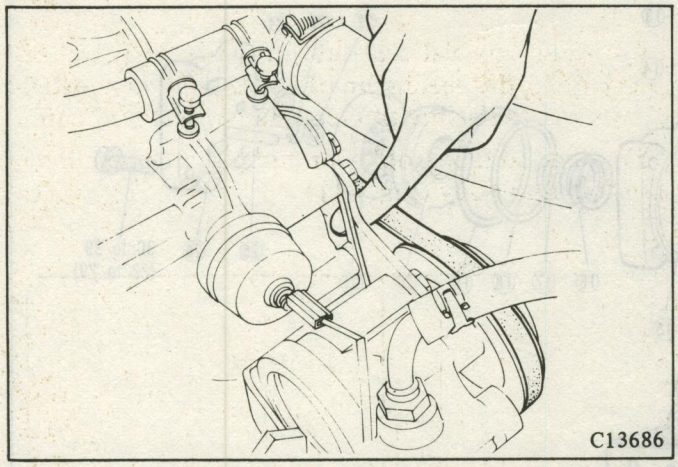


Fig. 113 Adjusting the Drive Belt Tention

(2) Install oil pump assembly to engine.

(3) Install pulley to oil pump assembly and tighten pulley attaching bolts.

(4) Install drive belt on plley and adjust the tension to specification.

Description	Service standard
Belt tension at top center	7 to 10 mm/100N (1/4 to 3/8 in/22 lbs.)

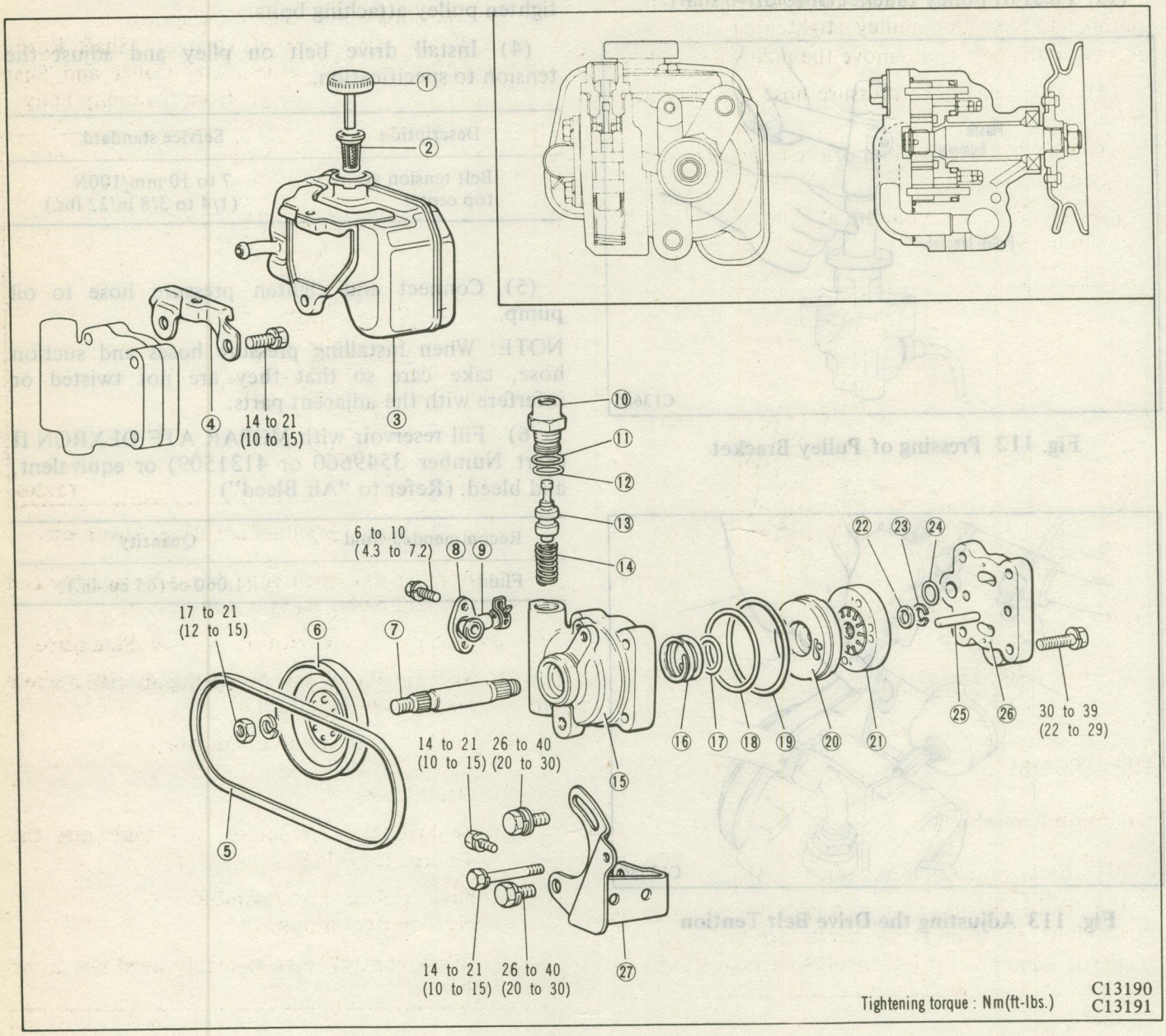
(5) Connect and tighten pressure hose to oil pump.

NOTE: When installing pressure hoses and suction hose, take care so that they are not twisted or inferfere with the adjacent parts.

(6) Fill reservoir with MOPAR ATF DEXRON II (Part Number 3549660 or 4131509) or equivalent, and bleed. (Refer to "Air Bleed")

Recommended fluid	Quantity
Fluid	1.060 cc (65 cu. in.)

OIL PUMP (Reservoir in unit type)



(1) Oil reservoir cap
(2) Oil filter
(3) Oil reservoir
(4) Oil reservoir bracket
(5) Drive bet
(6) Oil pump pulley
(7) Shaft
(8) Suction plate
(9) Suction tube
(10) Connector
(11) O ring
(12) O ring
(13) Flow control valve assembly
(14) Flow control spring
(15) Body, oil pump
(16) Spring
(17) O ring
(18) O ring
(19) O ring
(20) Side plate
(21) Rotor and cam ring
(22) Collar
(23) Snap ring
(24) O ring
(25) Dowel
(26) Cover
(27) Bracket, oil pump

Fig. 114 Oil Pump Components

REMOVAL

(1) When it is needed to disassemble the oil pump, loosen the pulley tightening nut before removing the belt and remove the pulley and belt.

(2) Disconnect the pressure hose and the suction hose.

NOTE: Hold the open end of the hoses high or cover the end.

(3) Remove the oil pump attaching bolts and take out the pump. (Fig. 115)

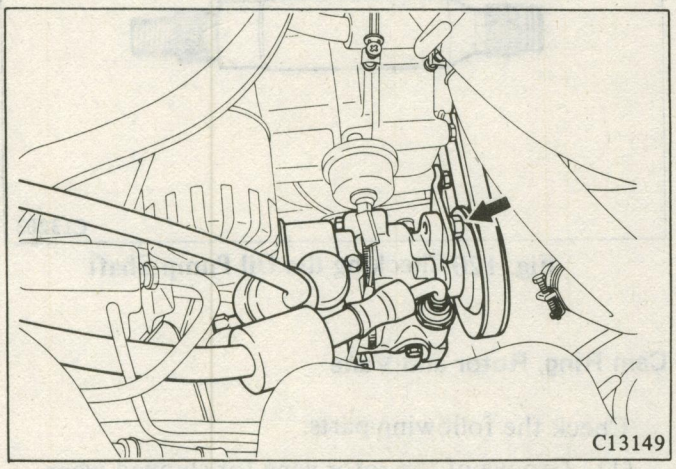


Fig. 115 Removing the Oil Pump

DISASSEMBLY

Oil Pump Assembly

(1) Remove the oil reservoir.

(2) Hold the oil pump in a vise, loosen the pump cover bolts, and remove the cover. Tap the cover with a plastic hammer if it is difficult to remove. (Fig. 116)

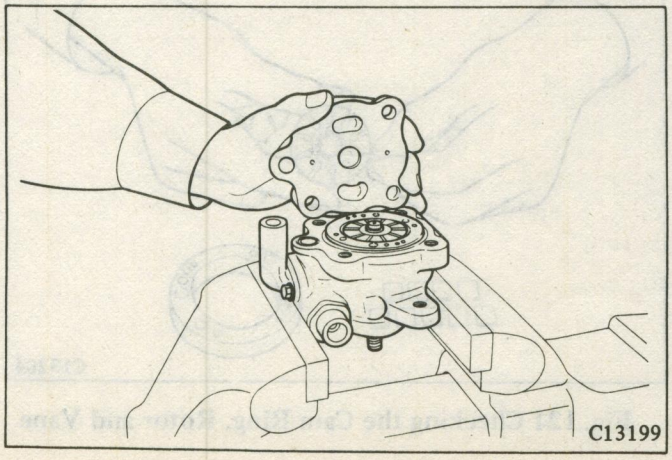


Fig. 116 Removing the Oil Pump Cover

(3) Remove and take out the following parts from the pump body. (Fig. 117)

- Cam ring
- Vanes
- Oring
- Side plate spring
- Shaft assembly (Shaft, Rotor, Side plate, Collar and Snap ring) from the pump body.

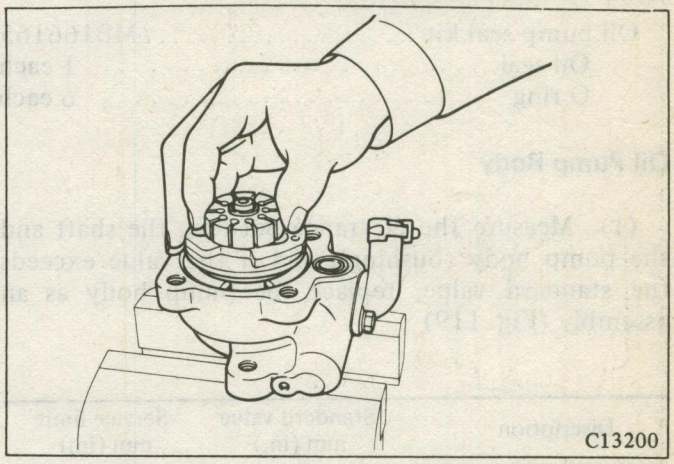


Fig. 117 Removing the Cam Ring, Rotor, etc.

(4) Remove the snap ring of shaft assembly and take out the following parts.

- Collar
- Rotor
- Side plate

(5) Remove the oil seal by prying up with a screw driver or equivalent type tool.

(6) Remove the suction connector.

Flow Control Valve

(1) Remove the connector and take out the following parts. (Fig. 118)

- Flow control valve assembly
- Flow control spring

NOTE: Flow control valve assembly need not to be disassembled.

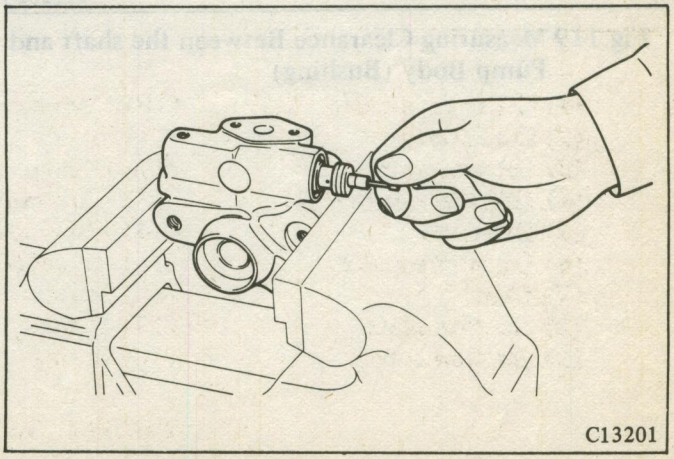


Fig. 118 Removing the Flow Control Valve Assembly and Spring

INSPECTION

Check the following items and replace or repair if necessary.

Replace the O ring and oil seal whenever disassembled. In this case it is recommended to provision the following parts.

Oil pump seal kit MB166165
Oil seal ..... 1 each
O ring ..... 6 each

Oil Pump Body

(1) Measure the clearance between the shaft and the pump body (bushing), and if the value exceeds the standard value, replace the pump body as an assembly (Fig. 119)

Discription	Standard value mm (in.)	Service limit mm (in.)
Clearance between shaft and pump body (bushing)	0.03 to 0.07 (.0012 to .0028)	0.09 (.0035)

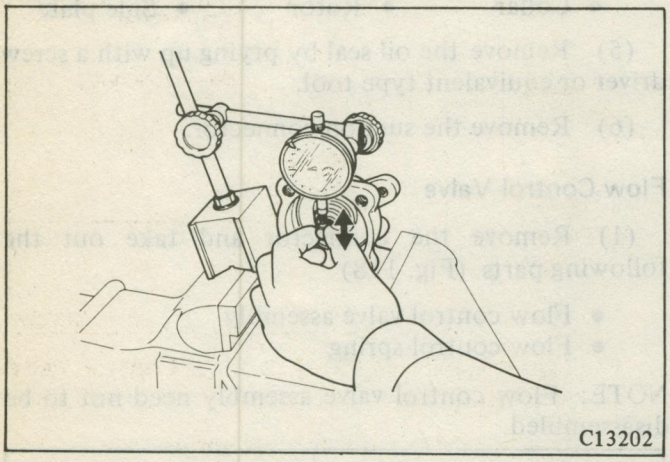


Fig. 119 Measuring Clearance Between the shaft and Pump Body (Bushing)

Oil Pump Shaft

Check the following parts.

(1) Oil seal lip for damage.

(2) Bushing end for damage.

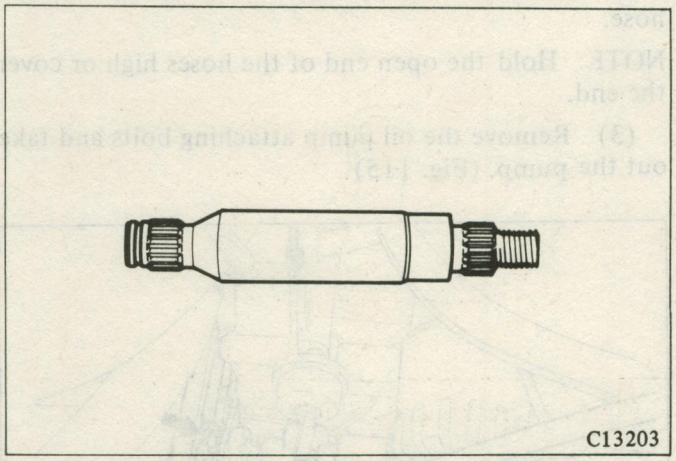


Fig. 120 Checking the Oil Pump Shaft

Cam Ring, Rotor and Vane

Check the following parts.

(1) Groove of the rotor vane for stepped wear

(2) Cam surface for stepped wear (Vane contact surface)

(3) Vane for damage

(4) Cam ring and rotor sides for grooving.

NOTE: Replace by the cartridge assembly (the cam, rotor and vane assembly) if any one of the above is unserviceable.

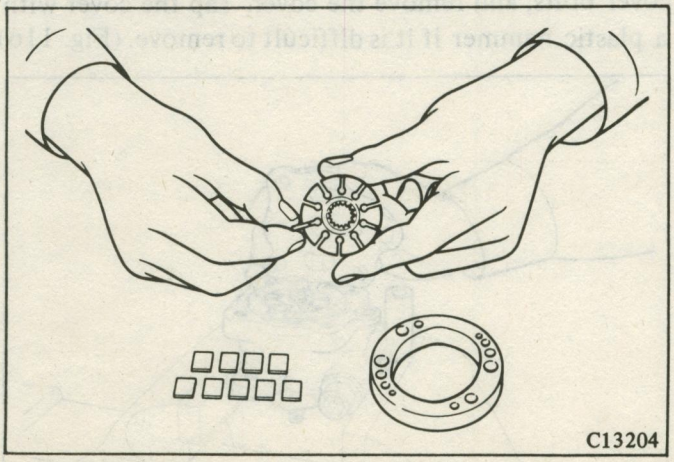


Fig. 121 Checking the Cam Ring, Rotor and Vane

Side Plate and Pump Cover

Check the following parts.

(1) Side of the side plate for grooving

(2) Side of the pump cover for grooving.

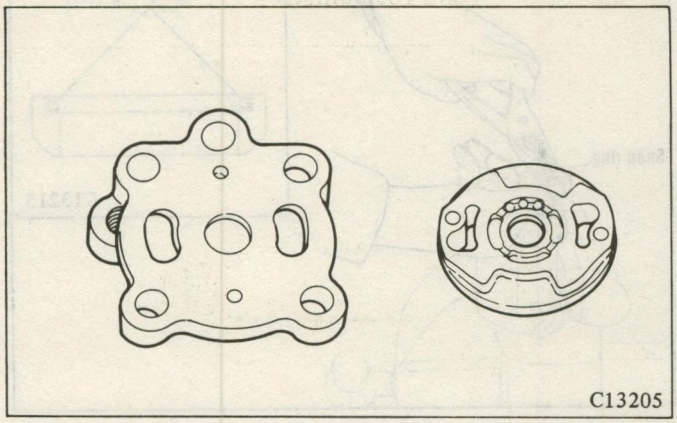


Fig. 122 Checking the Side Plate and Pump Cover

(3) Side plate spring for sagging

Description	Standard value mm (in.)	Service limit mm (in.)
Free length of side plate spring	19 (.75)	17 (.67)

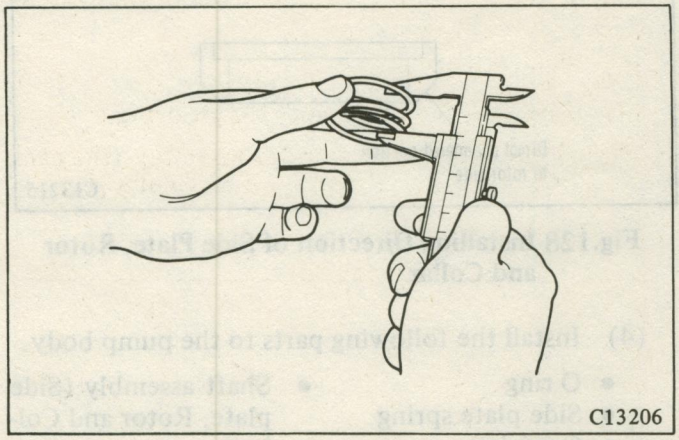


Fig. 123 Measuring the Side Plate Spring

Flow Control Valve and Flow Control Spring

Check the following parts.

(1) Sliding surface on the circumference of the control valve for damage

(2) Ports of the control valve for obstruction

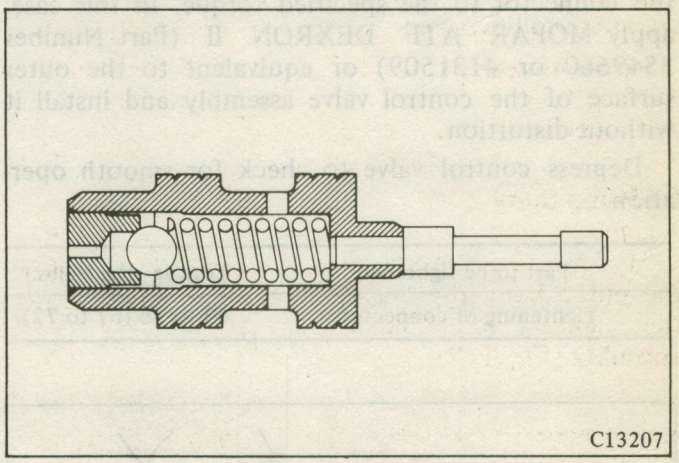


Fig. 124 Checking the Flow Control Valve

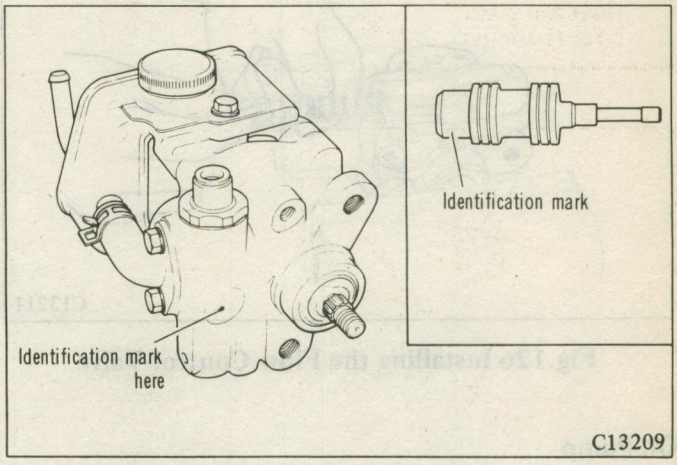


Fig. 125 Identification Marking of Flow Control Valve and Pump Body

(3) Sagging of the flow control spring

CAUTIONS:

- **Check oil pressure whenever the control valve or flow control spring is replaced.**

Description	Standard value mm (in.)	Service limit mm (in.)
Free length of flow control spring	52.5 (2.07)	49.5 (1.95)

ASSEMBLY AND ADJUSTMENT

Flow Control Valve

(1) Install the flow control spring and then the control valve assembly to the pump body, and tighten the connector to the specified torque. In this case, apply MOPAR ATF DEXRON II (Part Number 3549660 or 4131509) or equivalent to the outer surface of the control valve assembly and install it without distortion.

Depress control valve to check for smooth operation.

Part to be tightened	Torque Nm (ft-lbs.)
Tightening of connector	69 to 98 (51 to 72)

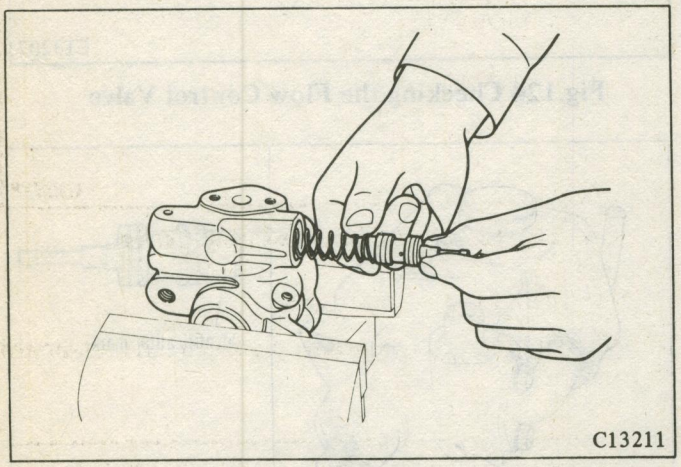


Fig.126 Installing the Flow Control Valve

Oil Pump

(1) Apply MOPAR Multi-Mileage Lubricant (Part Number 2525035) or equivalent to the lip of the oil seal and press into the pump body.

(2) Apply thin coat of MOPAR ATF DEXRON II (Part Number 3549660 or 4131509) or equivalent to the shaft and install in the pump body. In this case, take care not to damage the oil seal lip.

(3) Install the following parts to the shaft.

- Side plate
- Rotor
- Collar

Then tighten the pulley attaching nut temporarily, and hold the snap ring on the shaft using snap ring pliers. Push the rotor and collar upward until the collar seats over the snap ring.

CAUTIONS:
Pay attention for the installing direction of side plate, rotor and collar.

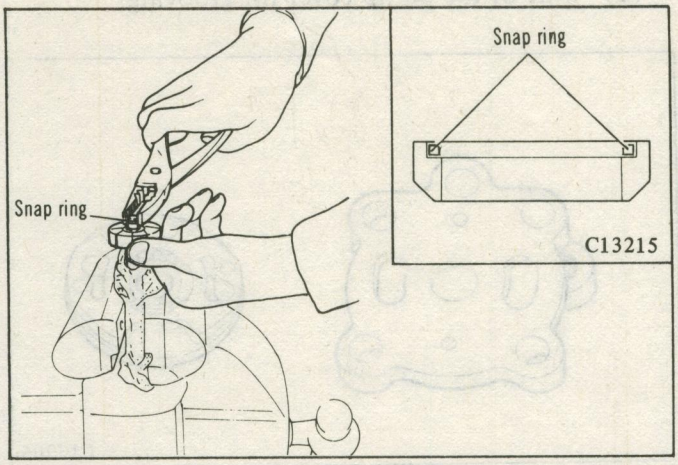


Fig.127 Installing the Snap Ring

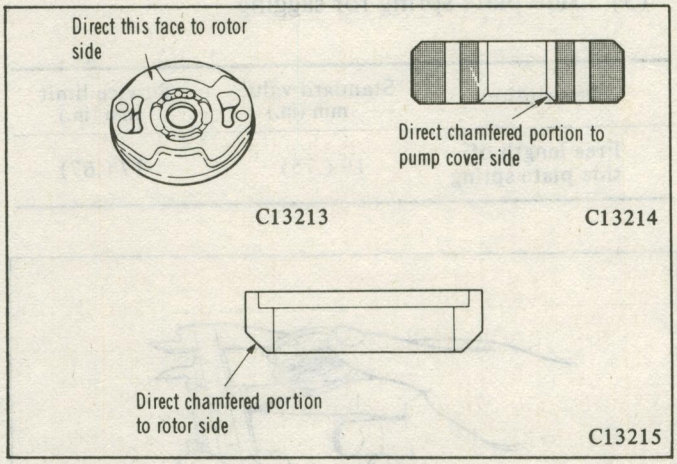


Fig.128 Installing Direction of Side Plate, Rotor and Collar

(4) Install the following parts to the pump body.

- O ring
- Side plate spring
- Cam ring
- Shaft assembly (Side plate, Rotor and Collar)

CAUTION:
Pay attention for the installing direction of cam ring. (Fig. 130).

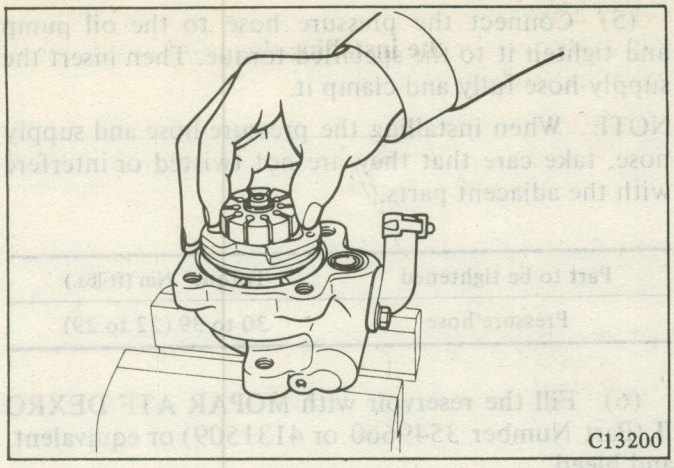


Fig. 129 Installing the Cam Ring and Shaft Assembly

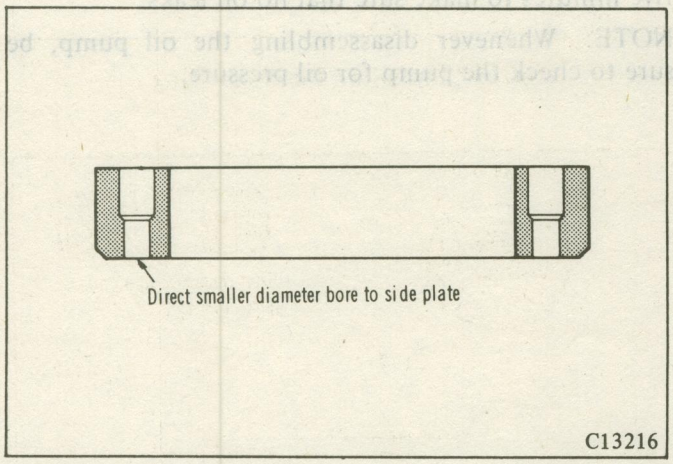


Fig. 130 Installing Direction of Cam Ring

(5) Install the vanes onto the rotor, Apply MOPAR ATF DEXRON II (Part Number 3549660 or 4131509) or equivalent to the vanes. When installing, make sure the installing direction of vanes.

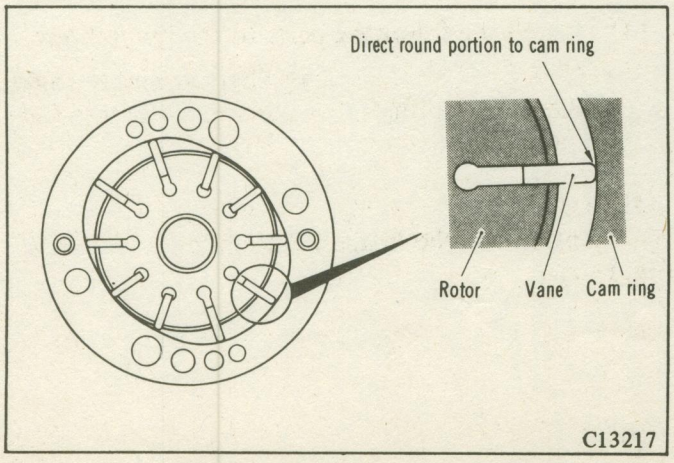


Fig. 131 Installing Direction of Vanes

(6) Install O ring to the pump body and tighten the cover with the oil pump bracket to the specified torque. In this case apply MOPAR ATF DEXRON II (Part Number 3549660 or 4131509) or equivalent to the O ring.

Part to be tightened	Torque Nm (ft-lbs.)
Oil pump cover	30 to 39 (22 to 29)

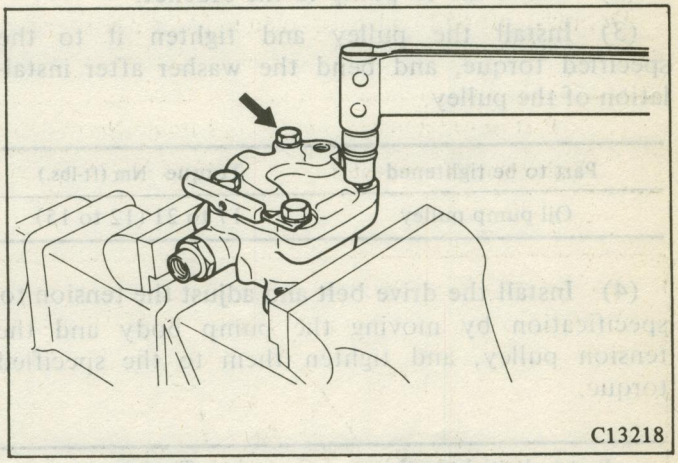


Fig. 132 Installing the Pump Cover

(7) Install the oil reservoir.

(8) Tighten the suction plate to the standard torque.

Part to be tightened	Torque Nm (ft-lbs.)
Suction connector	6 to 10 (4.3 to 7.2)

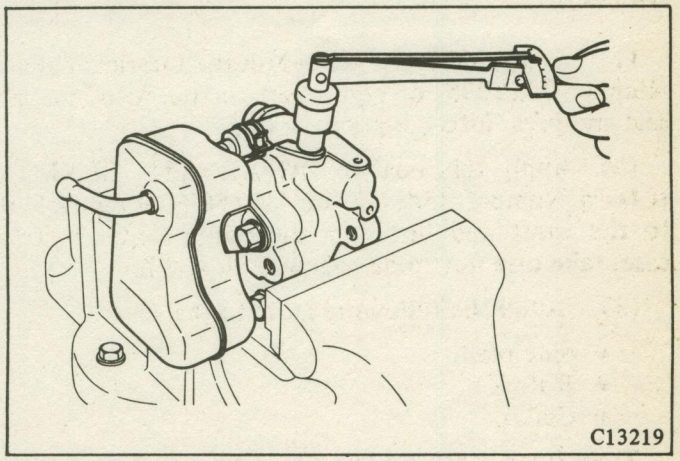


Fig. 133 Installing the Suction Plate

INSTALLATION

(1) Check the oil pump bracket for looseness, and retighten to the specified torque if necessary.

Part to be tightened	Torque Nm (ft-lbs.)
Oil pump bracket	14 to 21 (10 to 15)

(2) Install the oil pump to the bracket.

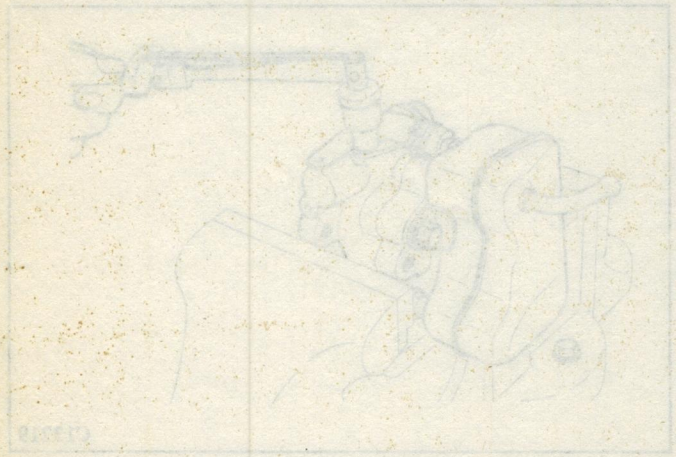
(3) Install the pulley and tighten it to the specified torque, and bend the washer after installation of the pulley.

Part to be tightened	Torque Nm (ft-lbs.)
Oil pump pulley	17 to 21 (12 to 15)

(4) Install the drive belt and adjust the tension to specification by moving the pump body and the tension pulley, and tighten them to the specified torque.

Part to be tightened	Torque
Belt tension at top center	7 to 10 mm/100 N (1/4 to 3/8 in./22 lbs.)

Parts to be tightened	Torque Nm (ft-lbs.)
Oil pump	26 to 40 (20 to 30)



(5) Connect the pressure hose to the oil pump and tighten it to the specified torque. Then insert the supply hose fully and clamp it.

NOTE: When installing the pressure hose and supply hose, take care that they are not twisted or interfere with the adjacent parts.

Part to be tightened	Torque Nm (ft-lbs.)
Pressure hose	30 to 39 (22 to 29)

(6) Fill the reservoir with MOPAR ATF DEXRO II (Part Number 3549660 or 4131509) or equivalent, and bleed.

(7) Start the engine and run it at 2,000 rpm for five minutes to make sure that no oil leaks.

NOTE: Whenever disassembling the oil pump, be sure to check the pump for oil pressure.

SPECIFICATIONS

MANUAL STEERING

Description	Specifications
Staring gear type	Ball-nut type
Steering gear ratio	18.5 to 22.5
Steering angle	
Inside wheel	$37^{\circ}\ {}^{0}_{-3}{}^{\circ}$
Outside wheel	$30.5^{\circ}\ {}^{0}_{-3}{}^{\circ}$
Tilt stroke	50 mm (1.97 in.)

POWER STEERING

Description	Specifications
Steeringgear type	Ball-nut type
Steering gear ratio	17.8
Steering angle	
Inside wheel	$37^{\circ}\ {}^{0}_{-3}{}^{\circ}$
Outside wheel	$30.5^{\circ}\ {}^{0}_{-3}{}^{\circ}$
Tilt stroke	50 mm (1.97 in.)

SERVICING STANDARD

MANUAL STEERING

Unit:mm(in.) other wise noted

Discription	Standard dimension	Repair limit
Steering wheel play	Within 25 (1)	50 (2)
Length of steering shaft	800.4 to 802.4 (31.51 to 31.59)	
Steering shaft bend	Less than 0.5 (Less than .020)	
Steering shaft-to-shaft bearing clearance	0.010 to 0.052 (.0004 to .0020)	
Total looseness of installed steering column (at the circumference of wheel)	1.0 (.04)	
Crosshaft axial play	0 to 0.05 (0 to .002)	
Backlash between crossshaft gear and mainshaft rack	0 to 0.05 (0 to .002)	
Mainshaft preload (without crossshaft)	0.34 to 0.54 Nm (3.0 to 4.8 in-lbs.)	
Mainshaft preload (on assembly)	0.64 to 0.83 Nm (5.7 to 7.4 in-obs.)	
Distance between stud bolts at tie rod ends		
Left the rod	374.5 to 376.5 (14.74 to 14.82)	
Right the rod	376.0 to 378.0 (14.80 to 14.88)	
Axial play of tie rod end socket and stud	0 (0)	
Ball joint deflection	1.5 (.06)	
Relay rod-to-Pitman arm and relay rod-to-idler arm clearance	3.7 to 4.3 (.15 to .17)	

POWER STEERING

Unit:mm(in.) other wise noted

Description	Standard dimension	Repair limit
Steering wheel play	25 (Within 1)	50 (2)
Length of steering shaft	711.5 to 712.5 (28.01 to 28.05)	
Steering shaft bend	Less than 0.5 (.02)	
Clearance between slider and socket	0.50 to 0.55 (.020 to .021)	
Distance between column clamp and joint cover end	457.6 to 459.6 (18.01 to 18.09)	
Location of column clamp	19° to 25°	
Pitman arm deflection	0.5 to (.02)	
Backlash between the groove of rack piston and balls	0.05 to 0.10 (.002 to .004)	0.2 (.008)
Crossshaft axial play	0 to 0.05 (0 to .002)	
Input worm shaft preload	0.25 to 0.65 (.18 to .47)	
Total starting torque of input worm shaft (neutral)	0.5 to 0.9 Nm (.36 to .65 ft-lbs.)	
Clearance between center of bolt hole in gear box and Pitman arm	19.5 (.77)	
Clearance between shaft and pump body (bushing)	0.03 to 0.07 (.0012 to .0028)	0.09 (.0035)
Belt tension at center	7 to 10 mm/100N (¼ to 3/8 in./22 lbs.)	
Fluid capacity	1,060cc (65 cu.in.) – Reservoir tank for separate type 930 cc (56.8 cu.in.) – Reservoir tank for unit type	
*Oil pressure of oil pump		
valve closed	7,335 to 8,336 kPa (1,066 to 1,210 psi)	
Valve opened	981 kPa (142 psi) or less	
*Free length of side plate spring	19 (.75)	17 (.67)
*Free length of flow control spring	52.5 (2.07)	49.5 (1.95)

*: Data of oil pump is only for type of reservoir tank in unit.

TIGHTENING TORQUE

MANUAL STEERING

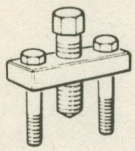
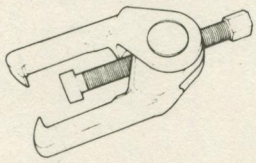
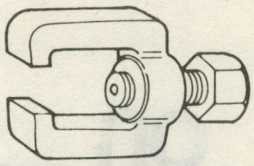
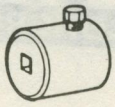
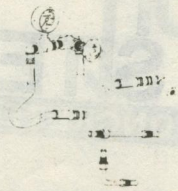
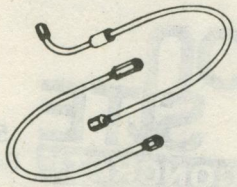
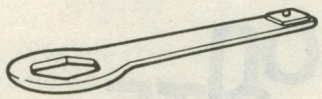
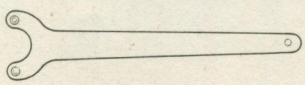
Description	Torque Nm (ft-obs.)
Steering coupling and yoke tightening	20 to 24 (15 to 18)
Steering shaft clamp tightening	15 to 20 (11 to 15)
Tilt bracket mounting bolt	8 to 12 (6 to 9)
Steering wheel lock nut tightening	34 to 44 (25 to 33)
Toe board dust cover	3.0 to 4.9 (2.2 to 3.6)
Gear box end cover tightening	15 to 20 (11 to 14)
Gear box upper cover tightening	15 to 20 (11 to 14)
Gear box tightening	34 to 39 (25 to 29)
Pitman arm tightening	127 to 147 (94 to 109)
Relay rod and pitman arm installation	34 to 44 (25 to 33)
Tie rod end tightening	34 to 44 (25 to 33)
Tie rod socket and relay rod tightening	34 to 44 (25 to 33)
Tie rod end stud locking nut tightening	49 to 54 (36 to 40)
Idler arm tightening	39 to 59 (29 to 43)
Idler arm bracket to frame tightening	34 to 39 (25 to 29)
Pitman arm and relay rod tightening	34 to 44 (25 to 33)
Relay rod and idler arm installation	34 to 44 (25 to 33)

POWER STEERING

Description	Torque Nm (ft-lbs.)
Column clamp mounting bolt	5 to 8 (3.6 to 5.8)
Tilt bracket mounting bolt	8 to 12 (6 to 9)
Dash panel cover mounting bolt	3 to 5 (2.2 to 3.6)
Bleeder screw	6 to 9 (4.3 to 6.5)
Top cover tightening	1 to 1.4 (.72 to 1.01)
Valve housing nut tightening	176 to 225 (130 to 166)
Circulator holder tightening	3.5 to 4.4 (2.5 to 3.3)
Valve housing tightening	44 to 54 (33 to 40)
Side cover tightening	44 to 54 (33 to 40)
Pitman arm tightening	127 to 147 (94 to 109)
Gear box tightening	54 to 64 (40 to 47)
Tie rod socket and relay rod tightening	34 to 44 (25 to 33)
Attaching of gauge box	30 to 39 (22 to 29)
Pressure hose installation	39 to 49 (29 to 36)
Pressure hose connection	30 to 39 (22 to 29)
Return hose connection	39 to 49 (29 to 36)
Oil pump brace bolt	26 to 40 (19.3 to 30)
*Tightening of connector	69 to 98 (51 to 72)
*Oil pump cover tightening	30 to 39 (22 to 29)
*Suction connector tightening	6 to 10 (4.3 to 7.2)
*Oil pump bracket tightening	14 to 21 (10 to 15)
*Oil pump pulley tightening	17 to 21 (12 to 15)
*Oil pump tightening	26 to 40 (20 to 30

* Data of oil pump is only for type of reservoir tank in unit.

SPECIAL TOOLS

Tool No.	Name of tool	Illustration	Use	Remarks
DT-1001-A	Steering wheel puller		For removal of steering wheel	
C-3894-A	Steering linkage puller		For removal of tie rod and relay rod	New special tool
CT-1106	Pitman arm puller		For removal of pitman arm	
CT-1108	Preload socket		For checking mainshaft preload	
C-3309-E	Oil pressure gauge		For measurement of oil pump pressure with C-4535	Power steering only
C-4535	Hose set–Pump pressure checking		For measurement of oil pump pressure with C3309E	Power steering only
MB990667	Housing nuts special spanner		For removal and retightening of housing nut	Power steering only
MB990853	Top cover remover		For removal of gear box top cover	Power steering only

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