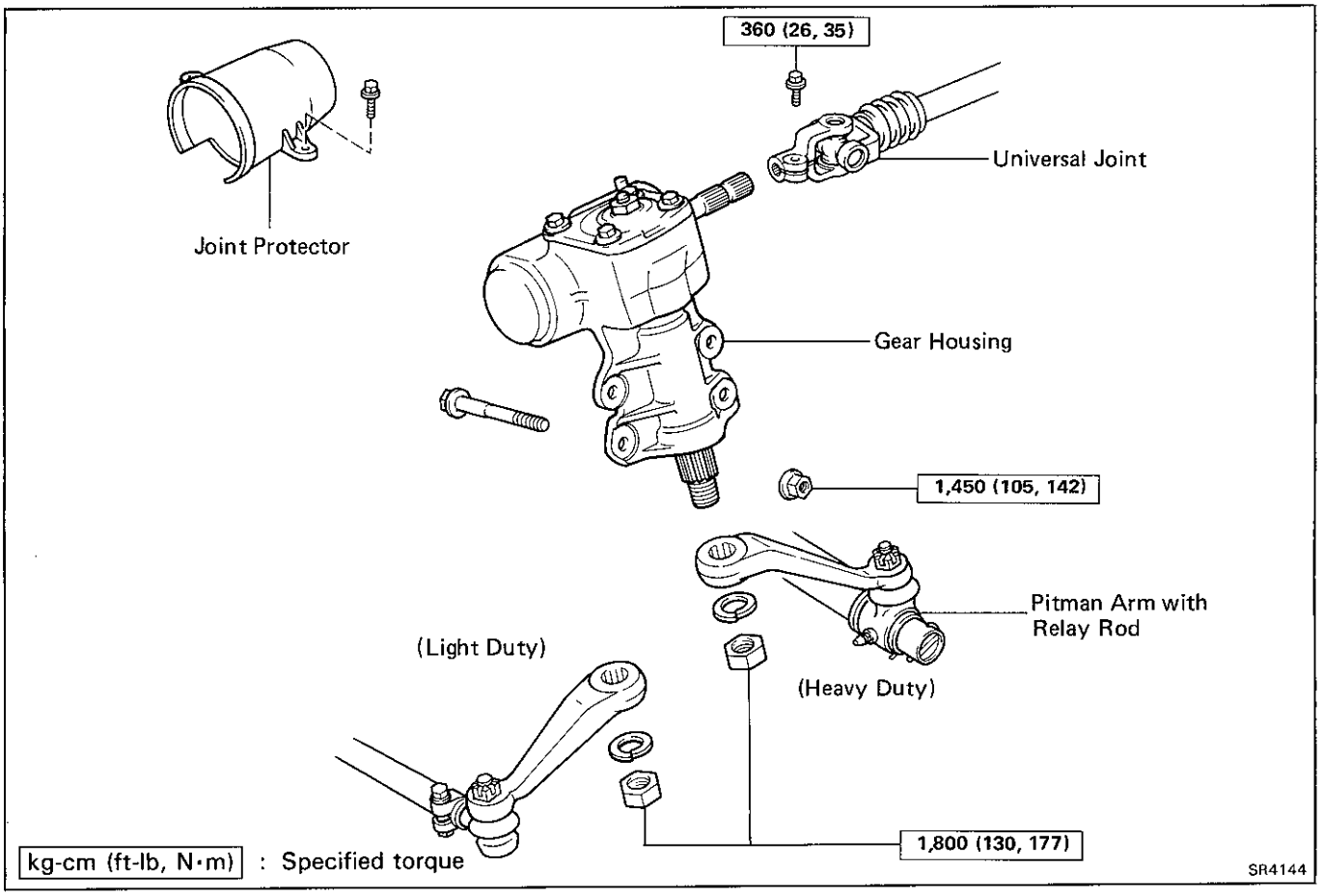
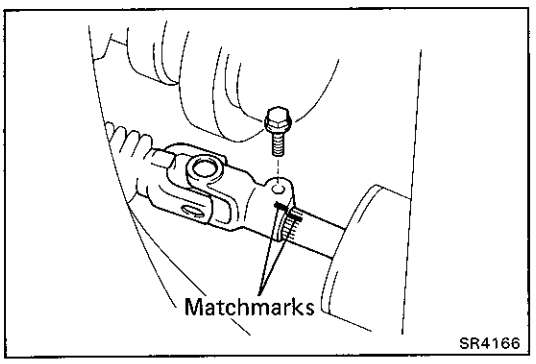
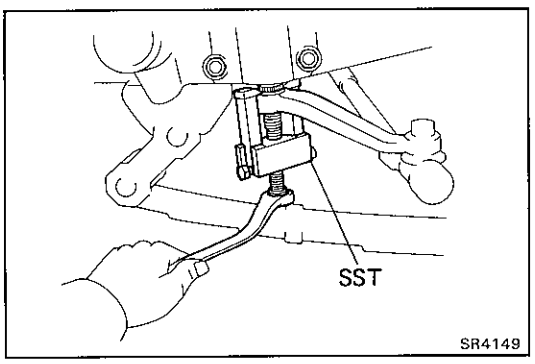
MANUAL GEAR HOUSING

REMOVAL AND INSTALLATION OF MANUAL GEAR HOUSING

Remove and install the parts as shown.







(MAIN POINT OF REMOVAL AND INSTALLATION)

1. DISCONNECT UNIVERSAL JOINT

(a) Loosen the column side set bolt.

(b) Remove the gear side set bolt.

(c) Place matchmarks on the universal joint and worm shaft.

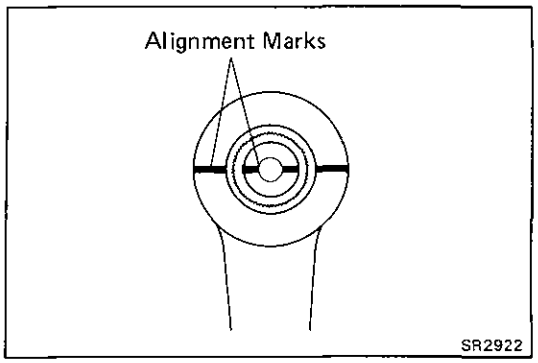
(d) Slide the shaft rearward to disconnect the shaft from the worm shaft.

2. DISCONNECT PITMAN ARM FROM GEAR HOUSING

(a) Loosen the pitman arm nut.

(b) Using SST, disconnect pitman arm from the gear housing.

SST 09628-62011



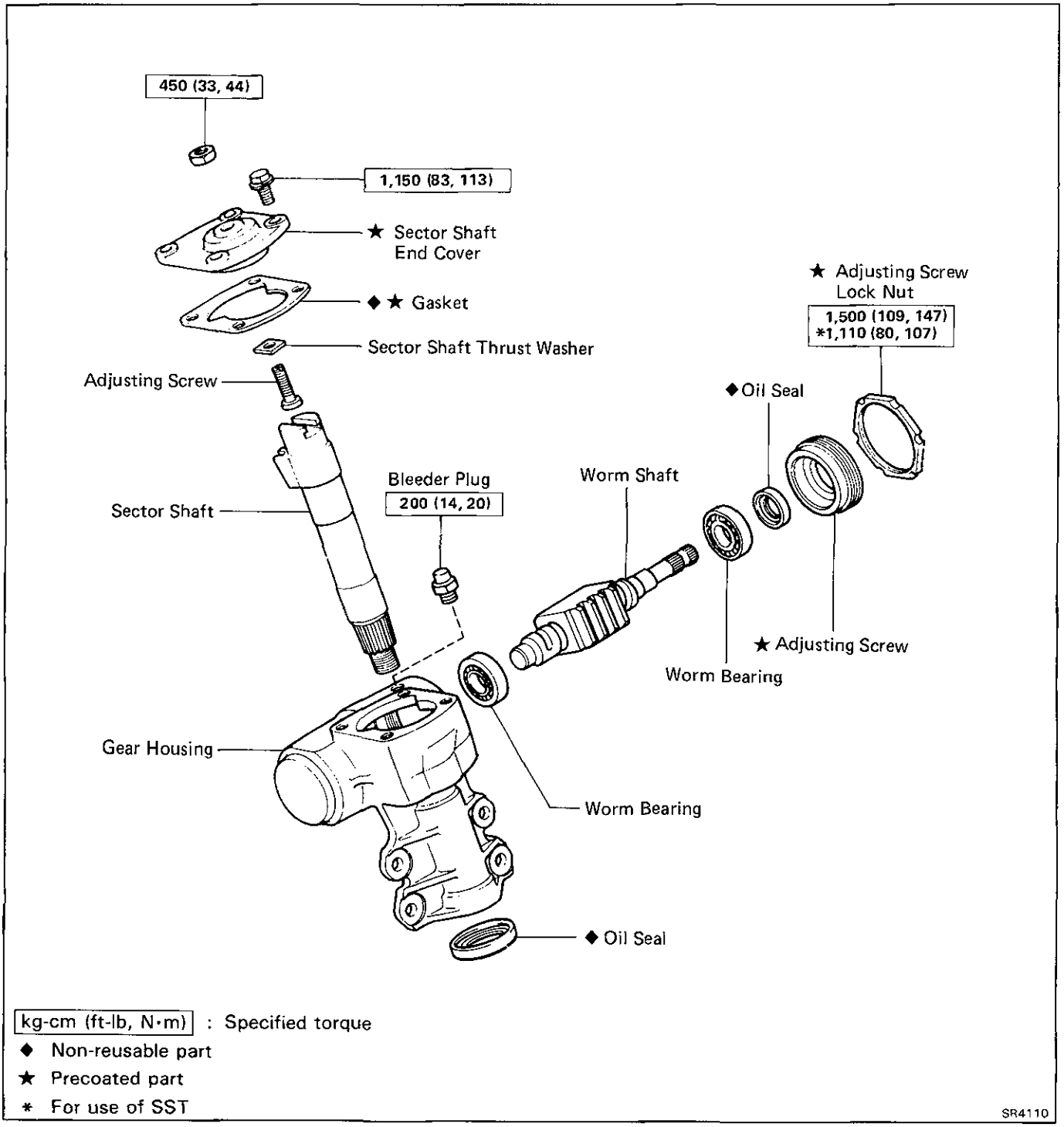
3. CONNECT PITMAN ARM TO GEAR HOUSING

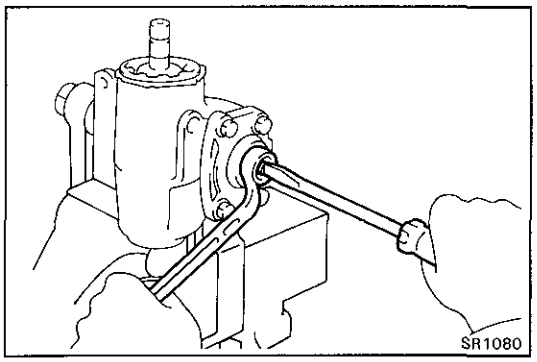
(a) Align the alignment marks on the sector shaft and pitman arm and install the spring washer and arm.

(b) Tighten the pitman arm nut.

Torque: 1,800 kg-cm(130 ft-lb, 177 N·m)

COMPONENTS





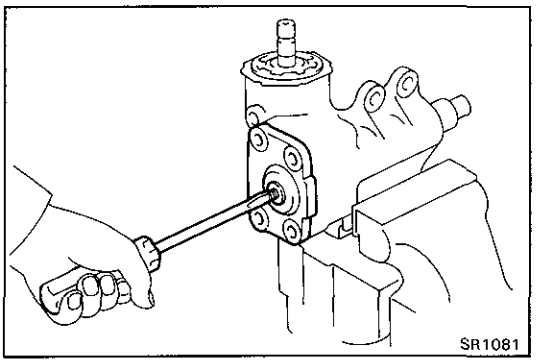
DISASSEMBLY OF MANUAL GEAR HOUSING

(See page SR-21)

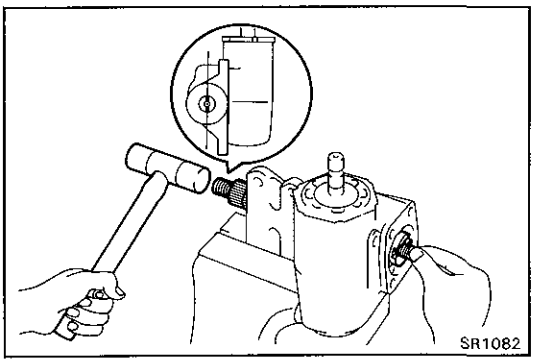
1. REMOVE BLEEDER PLUG AND DRAIN GEAR OIL

2. REMOVE END COVER AND SECTOR SHAFT

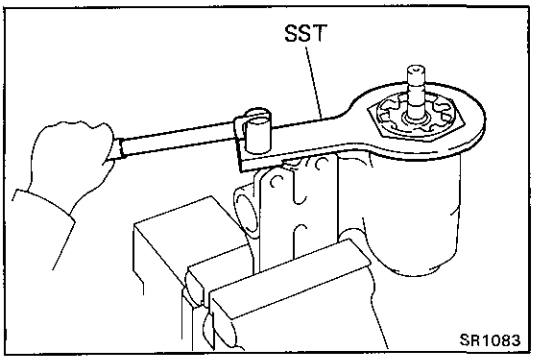
(a) Remove the adjusting screw lock nut and four bolts.



(b) Remove the end cover by turning the adjusting screw clockwise with a screwdriver.



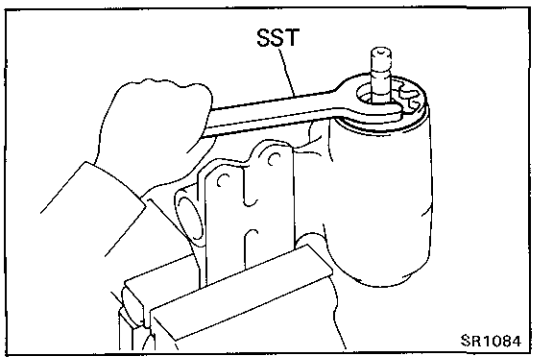
(c) Using a plastic hammer, tap out the sector shaft and adjusting screw from the gear housing.



3. REMOVE LOCK NUT

Using SST, remove the lock nut.

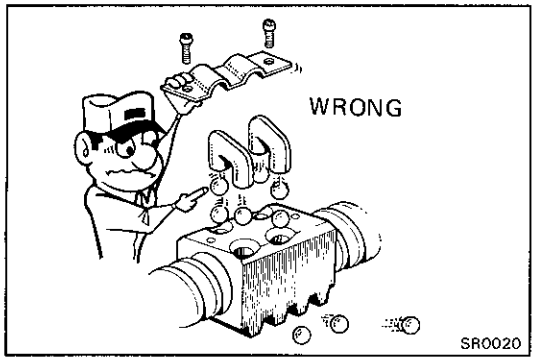
SST 09617-60010



4. REMOVE BEARING ADJUSTING SCREW

Using SST, remove the adjusting screw.

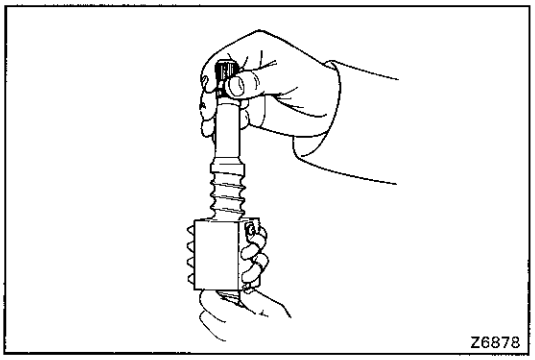
SST 09616-30020



5. REMOVE WORM SHAFT

Pull the worm shaft out of the gear housing.

NOTICE: Do not disassemble the ball nut from the steering worm shaft.



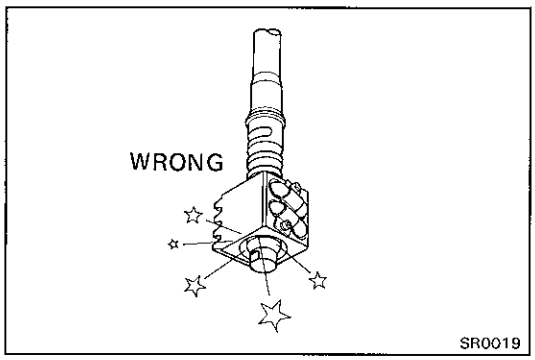
INSPECTION AND REPLACEMENT OF MANUAL GEAR HOUSING

1. INSPECT WORM AND BALL NUT

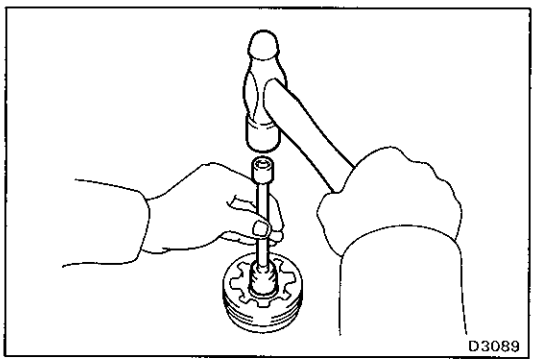
(a) Check the worm and ball nut for wear or damage.

(b) Check that the nut rotates smoothly down the shaft by its own weight.

If a problem is found, repair or replace the worm.



NOTICE: Do not allow the ball nut to hit the end of the worm shaft.



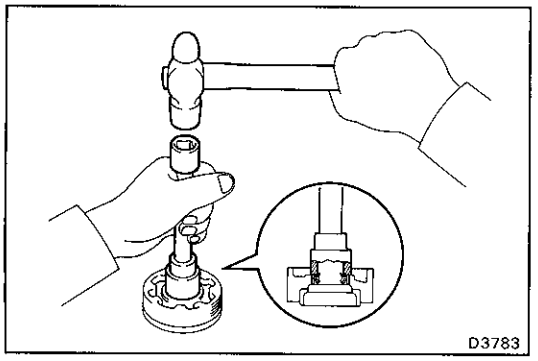
2. INSPECT WORM BEARINGS AND OIL SEAL

Check for wear or damage.

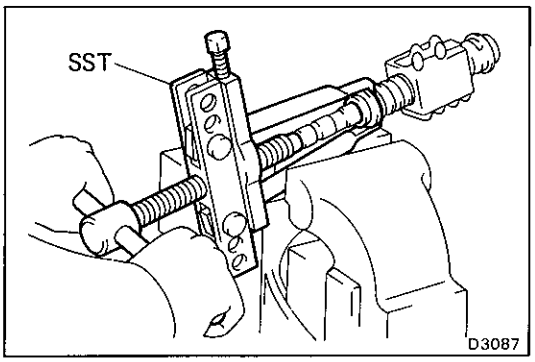
If a problem is found, replace the bearings, bearing races and oil seal.

3. IF NECESSARY, REPLACE OIL SEAL

(a) Using a 19 mm socket wrench, drive out the oil seal.



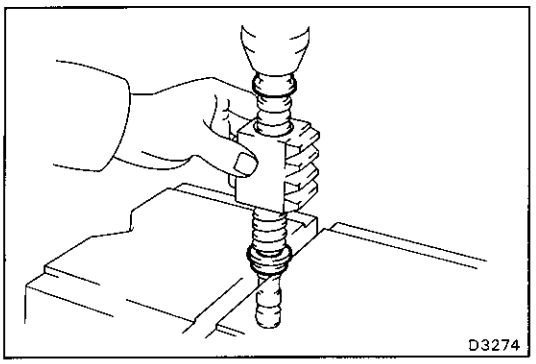
(b) Using a 23 mm socket wrench, drive in the oil seal.



4. IF NECESSARY, REPLACE WORM BEARINGS

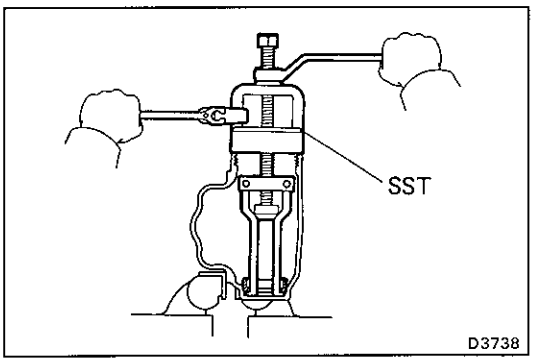
(a) Using SST, remove the both side bearings.

SST 09950-20017



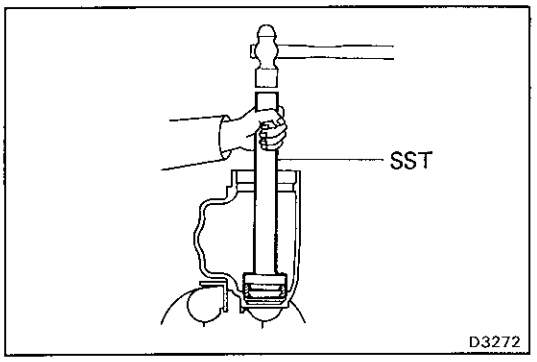
(b) Using a press, install the both side bearings.

NOTICE: Be careful not to damage the ball nut while holding it by hand.



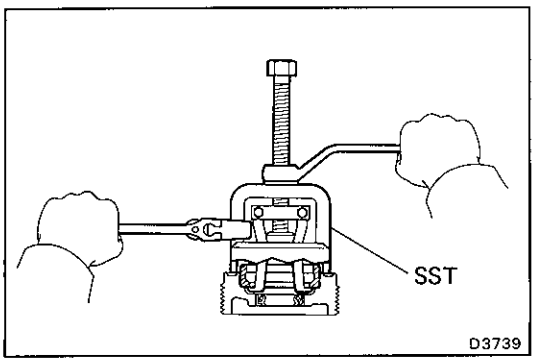
(c) Using SST, remove the outer race from the gear housing.

SST 09612-65014 (09612-01030)



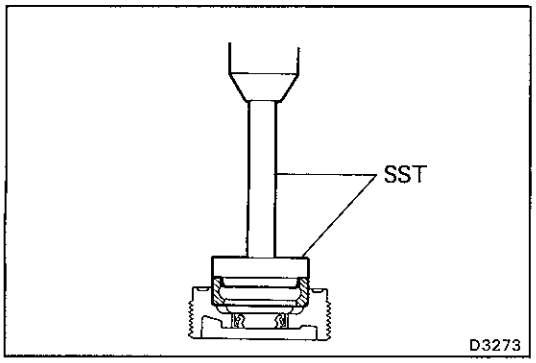
(d) Using SST, drive in the outer race into the gear housing.

SST 09550-10012 (09552-10010, 09559-10010)



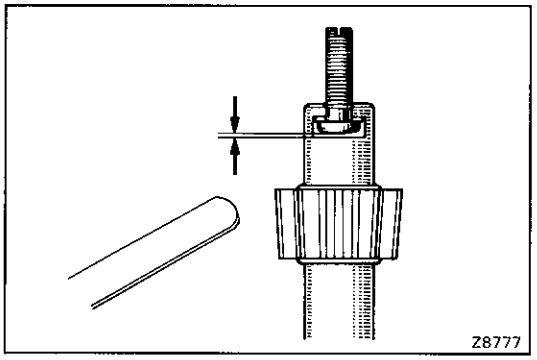
(e) Using SST, remove the outer race from the adjusting screw.

SST 09612-65014 (09612-01040)



(f) Using SST, press in the outer race into the adjusting screw.

SST 09550-10012 (09552-10010, 09559-10010)



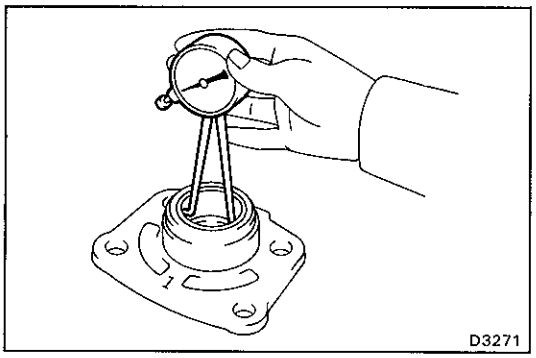
5. INSPECT SECTOR SHAFT

Measure shaft thrust clearance with a feeler gauge.

Maximum clearance: 0.05 mm (0.0020 in.) or less.

If necessary, install a new thrust washer which will provide the minimum clearance between the sector shaft and the adjusting screw.

Thrust washer thickness mm (in.)	
1.95 (0.0768)	2.05 (0.0807)
2.00 (0.0787)	



6. INSPECT SECTOR SHAFT END COVER

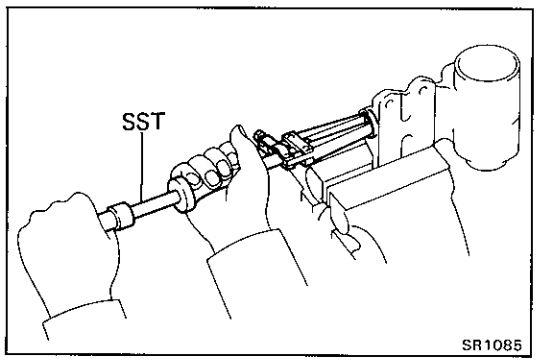
(a) Check for damage.

(b) Check the bushing for wear or damage.

If necessary, replace the end cover.

HINT: When replacing the end cover, replace with one bearing the same number.

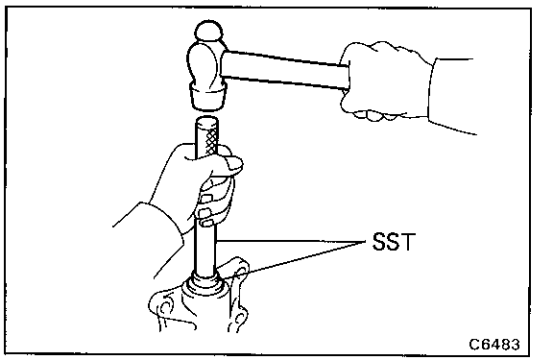
No.	Bushing inside diameter mm (in.)
1	36.055 — 36.065 (1.4195 — 1.4199)
2	36.045 — 36.055 (1.4191 — 1.4195)
3	36.035 — 36.045 (1.4187 — 1.4191)
4	36.025 — 36.035 (1.4183 — 1.4187)



7. IF NECESSARY, REPLACE OIL SEAL

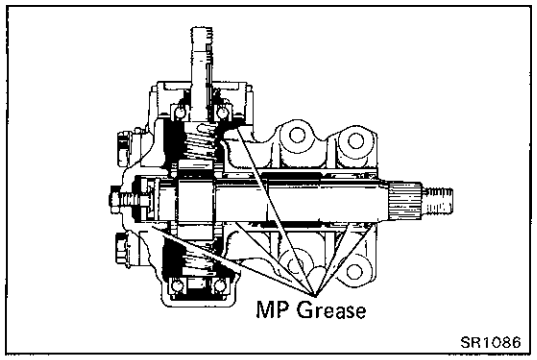
(a) Using SST, remove the oil seal.

SST 09308-00010



(b) Using SST, drive in the new oil seal.

SST 09550-10012 (09558-10010, 09552-10010)



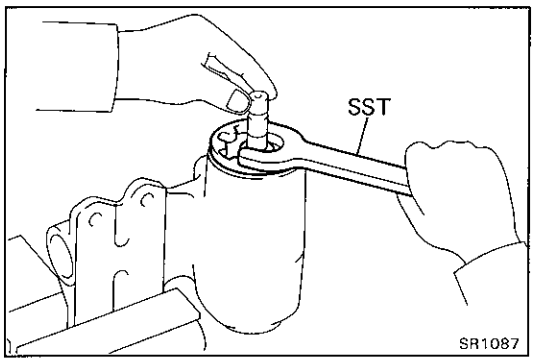
ASSEMBLY OF STEERING GEAR HOUSING

(See page SR-21)

1. APPLY MP GREASE TO BUSHING, NEEDLE ROLLER BEARINGS AND OIL SEALS

2. INSERT WORM SHAFT INTO GEAR HOUSING

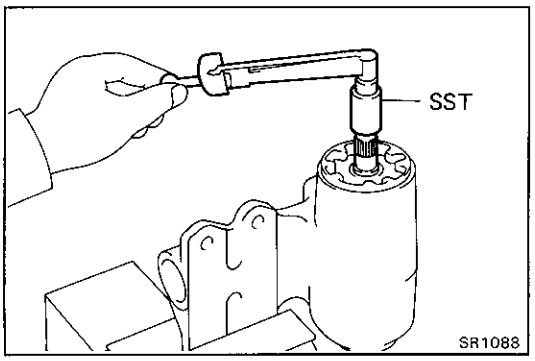
Place the worm bearings on the shaft and insert the shaft into the housing.



3. INSTALL AND ADJUST BEARING ADJUSTING SCREW

(a) Using SST, gradually tighten the adjusting screw until it is snug.

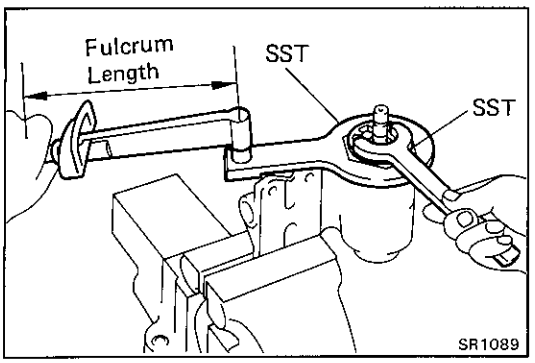
SST 09616-30020



(b) Using a torque meter and SST, measure the bearing preload in both directions. Turn the adjusting screw until the preload is correct.

Preload (starting): 3.5 — 5 kg-cm (3.0 — 4.3 in.-lb, 0.34 — 0.49 N·m)

SST 09616-00010



(c) Apply sealant to the lock nut.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

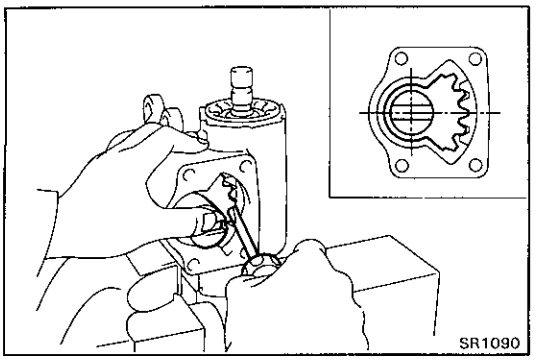
(d) Hold the adjusting screw in position with SST and tighten the lock nut with SST.

Torque: 1,110 kg-cm (80 ft-lb, 109 N·m)

SST 09616-30020, 09617-60010

HINT:

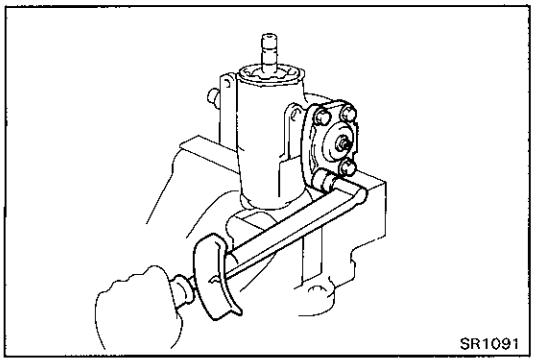
- Check that the bearing preload is still correct.
- Use a torque wrench with a fulcrum length of 425 mm (16.73 in.)



4. INSTALL SECTOR SHAFT

(a) Install the adjusting screw and thrust washer onto the sector shaft.

(b) Set the ball nut at the center of the worm shaft. Insert the sector shaft into the gear housing so that the center teeth mesh together.



5. INSTALL END COVER

(a) Apply sealant to the gasket.

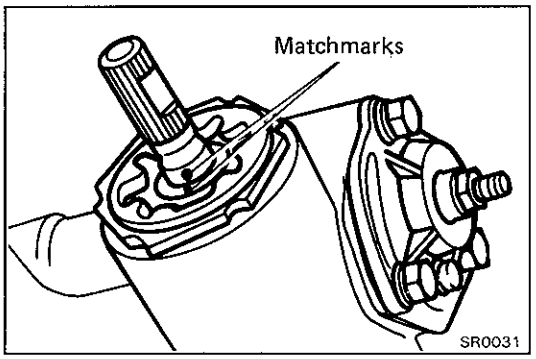
Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Install the end cover over the gasket.

(c) Using a screwdriver, loosen the adjusting screw as far as possible.

(d) Torque the four cover bolts.

Torque: 1,000 kg-cm (72 ft-lb, 98 N·m)

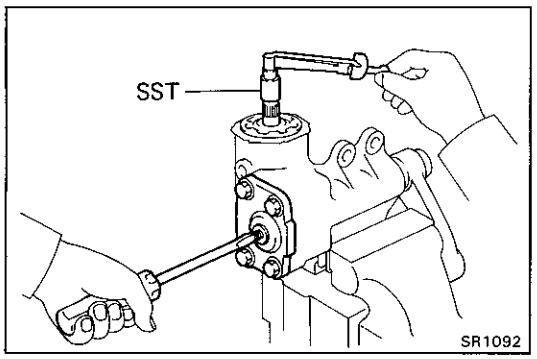


6. PLACE WORM SHAFT IN NEUTRAL POSITION

(a) Count the total shaft rotations and turn the shaft back half of that number.

(b) The worm shaft is now in neutral position.

(c) Place matchmarks on the worm shaft and housing to show neutral position.



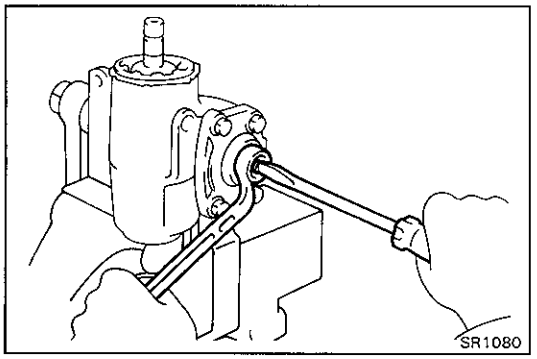
7. ADJUST TOTAL PRELOAD

Using a torque meter and SST, turn the adjusting screw while measuring the preload until it is correct.

HINT: Be sure that the worm shaft is in neutral position.

Preload (starting): 8 — 11 kg-cm (6.9 — 9.5 in.-lb, 0.78 — 1.08 N·m)

SST 09616-00010



8. TIGHTEN ADJUSTING SCREW LOCK NUT

(a) Apply sealant to the lock nut.

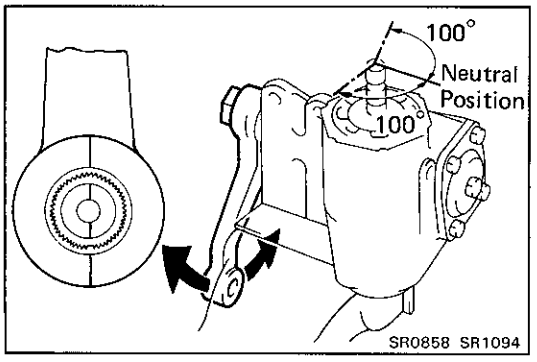
Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Hold the screw with a screwdriver while tightening the lock nut.

(c) Torque the lock nut.

Torque: 450 kg-cm (33 ft-lb, 44 N·m)

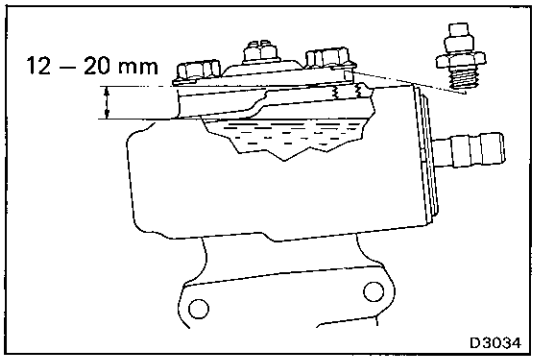
HINT: Check that the preload is still correct.



9. MEASURE SECTOR SHAFT BACKLASH

(a) Align the alignment marks on the pitman arm and sector shaft, and install the nut by hand.

(b) Install a dial indicator. Check that the sector shaft has no backlash within 100 degrees of the left and right sides from neutral position.



10. **REPLENISH WITH GEAR OIL**

    Oil type: API GL-4, SAE 90

    Capacity (Minimum): 640 cc (39.1 cu in.)

    Oil level: (at installation)
    12 – 20 mm (0.47 – 0.79 in.) from top

11. **INSTALL BLEEDER PLUG**

    Torque: 200 kg-cm (15 ft-lb, 20 N·m)