1. REMOVAL TRANSMISSION

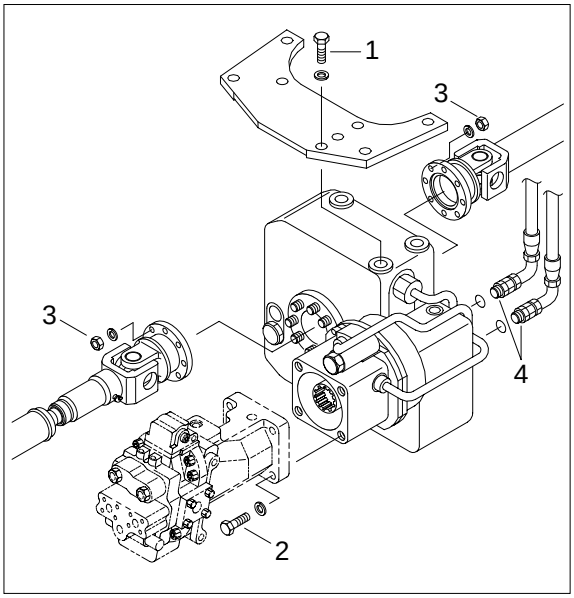
1) Transmission mounting bolt(1, M20)
   · Tightening torque : 39±4.2kgf · m
   (282±30.4lbf · ft)

2) Travel motor mounting bolt(2, M16)
   · Tightening torque : 29.6 ±3.2kgf · m
   (214 ±23.1lbf · ft)

3) Propeller shaft mounting nut(3, M10)
   · Tightening torque : 5.9 ±0.6kgf · m
   (42.7 ±4.3lbf · ft)

4) Hose assy(4, PF3/8)
   · Tightening torque : 5kg · m(36.2lb · ft)

5) Transmission weight : 132kg(290lb)



2. GENERAL INSTRUCTIONS

1) GENERAL WORKING INSTRUCTIONS

(1) This manual has been developped for the skilled serviceman, trained by manufacturer.

(2) During all operations, pay attention to cleanliness and skilled working.
Therefore,transmission removed from the machine must be cleaned prior to open them.

(3) We assume that the special tools, specified by manufacturer, will be used.
The special tools are available from manufacturer.

(4) After the disassembly, all components must be cleaned, especially corners, cavities and recesses of housing and covers.

(5) The old sealing compound must be carefully removed.

(6) Check lubricating holes, grooves and pipes for free passage. They must be free of residues, foreign material or protective compounds.

(7) The latter refers expecially to new parts.

(8) Parts which have been inevitably damaged in a disassembly operation, must be generally replaced by new ones, e.g. rotary seal rings, O-rings, U-section rings, cap boots, protective caps etc..

(9) Components such as roller bearings, thrust washers, synchronizing parts etc. which are subject to normal wear in automotive operation, must be checked by the skilled Serviceman.
He will decide if the parts can be reused.

(10) For the heating of bearings etc., hot plates, rod heaters or heating furnaces must be used.

(11) Never heat parts directly with the flame. An auxiliary solution would be to immerse the bearing in a vessel filled with oil, which is then heated with the flame.
In this way, damage to the bearings could be avoided.

(12) Ball bearings, covers, flanges and parts like that must be heated to about 90 to 100℃.

(13) Hot-mounted parts must be reset after cooling in order to assure a proper contact.

(14) Before pressing shafts, bearings etc. in position, both parts must be lubricated.

(15) During to reassembly, all specified adjustment values, testing specifications and tightening torque must be respected.

(16) After the repair, units are filled up with oil.

(17) After the oil filling, the oil level plugs and oil drain plugs must be tightened to the specified tightening torque.

2) IMPORTANT INSTRUCTIONS CONCERNING THE LABOUR SAFETY

(1) In principle, repairers are themselves responsible for the labour safety.

(2) The observance of all valid safety regulations and legal rules is a precondition to prevent damage to individuals and products during the maintenance and repair operations.

(3) Before starting the work, the repairers have to make themselves familiar with these regulations.

(4) The proper repair of these products requires especially trained personnel.

(5) The repairer himself is obliged to provide for the training.

3) LUBRICANT SPECIFICATIONS

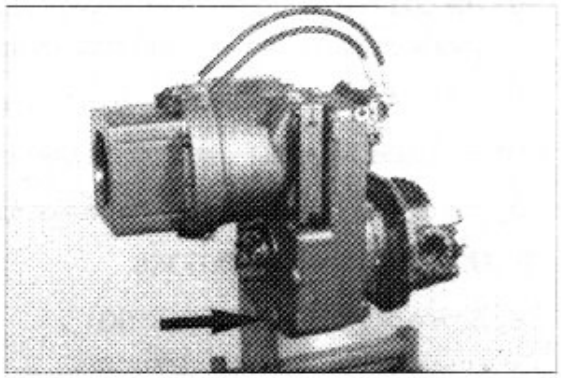
(1) Engine oil : API CD/CE/CF/SF/SG
MIL-L-2104 C/D/E
MIL-L-4615 C/D/E

(2) SAE 10W-30, 15W-40

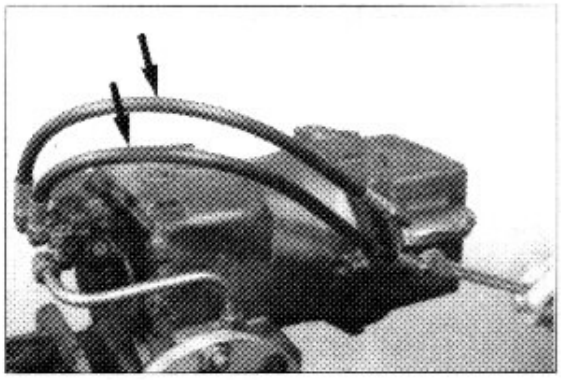
3. DISASSEMBLY

1) REMOVE SHIFTING CLUTCHES

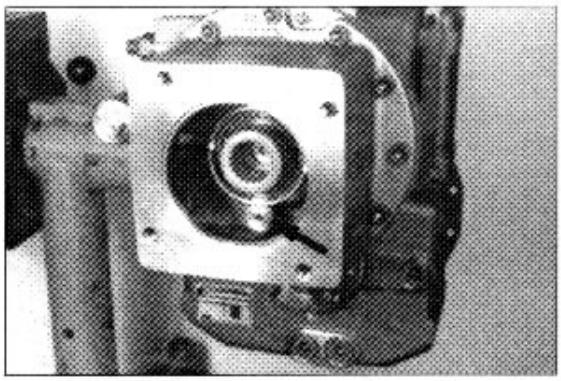
(1) Fasten gearbox in the assembly car.
Loosen screw plug(Arrow) and drain oil.



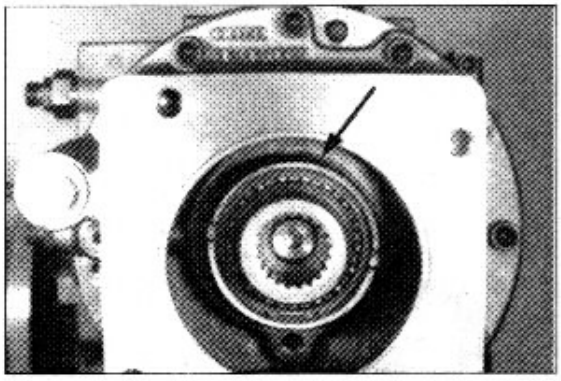
(2) Remove the two lines, see Arrows.



(3) Remove locking screw, see Arrow.

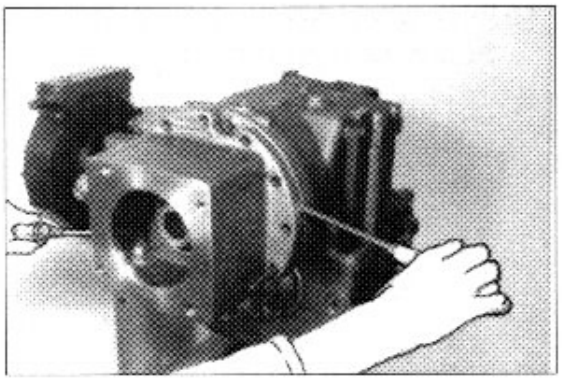


(4) Squeeze out snap ring(Arrow).

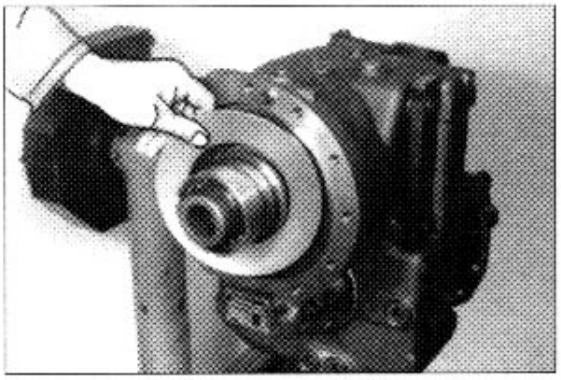


(5) Loosen socket head screws evenly, install two adjusting screws and separate drive casing from the gearbox.

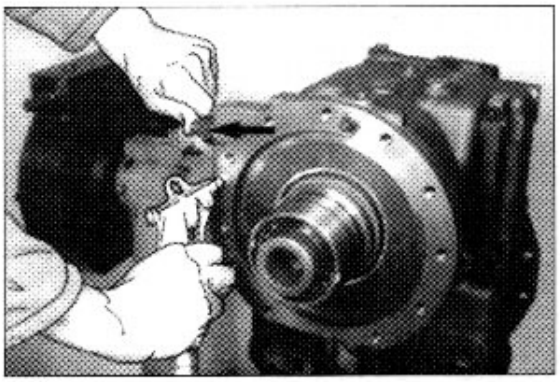
※ Drive casing is spring-loaded.



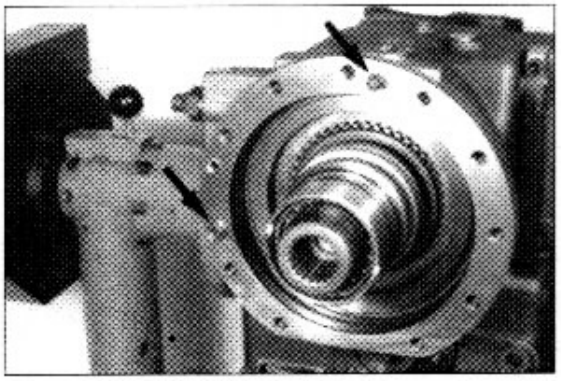
(6) Remove the two cup springs.



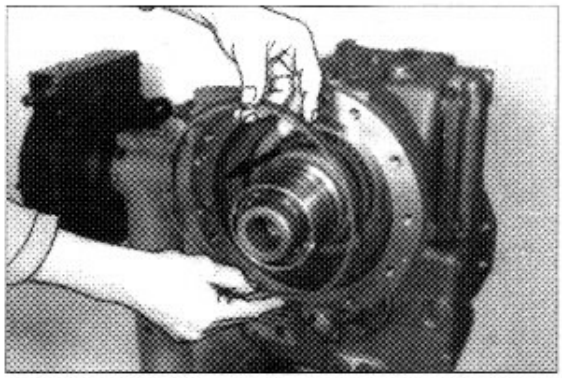
(7) Close supply line(Arrow) and press piston out of the housing bore, using compressed air.



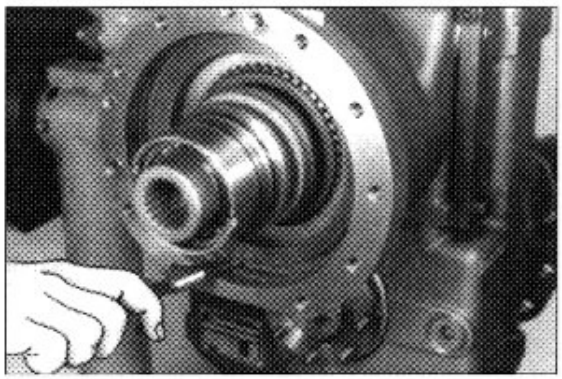
(8) Remove screw plug and breather(Arrows).



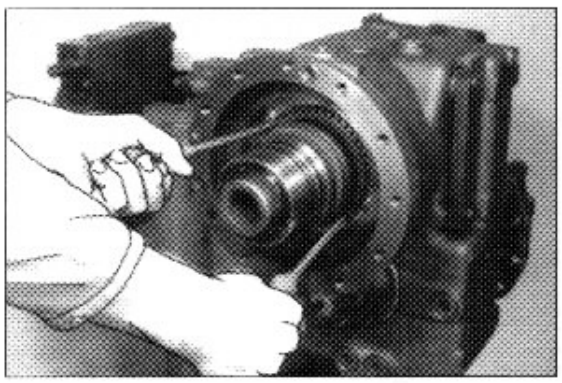
(9) Remove seal ring and back-up ring from the ring groove of the housing(Arrow).



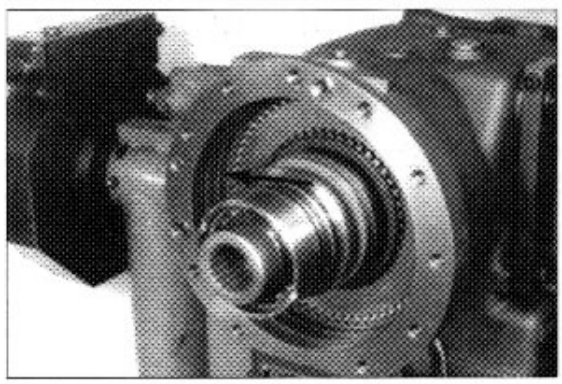
(10) Squeeze out snap ring.



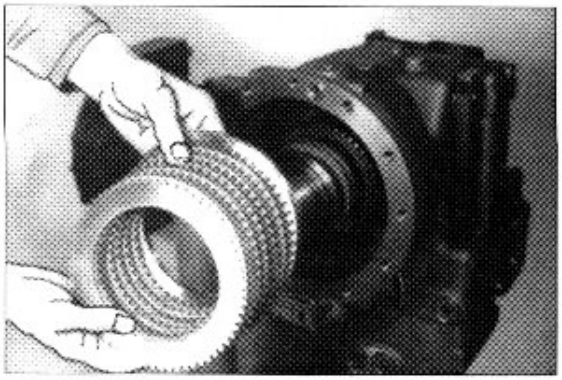
(11) Pull gasket out of the housing bore, using offset screw driver.



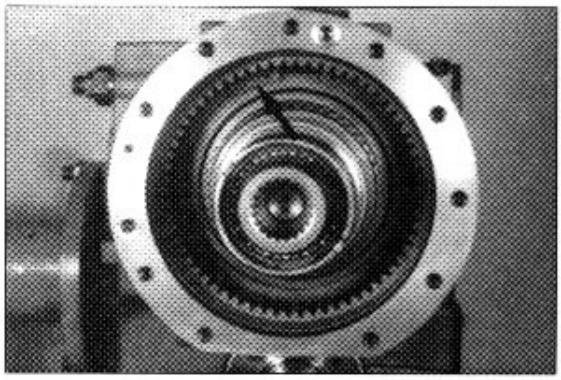
(12) Remove O-ring(Arrow).



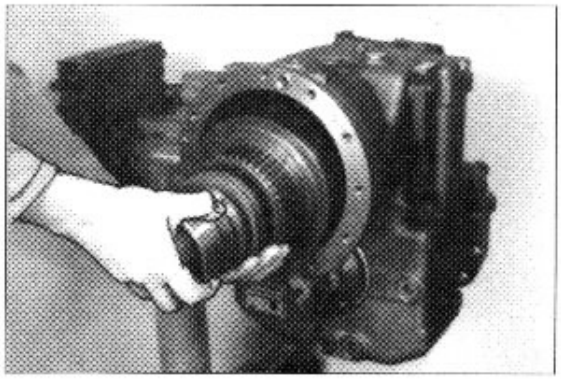
(13) Remove plate pack and backing plate.



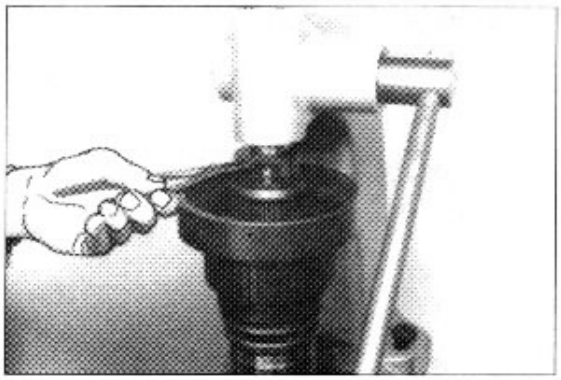
(14) Squeeze out circlip(Arrow).



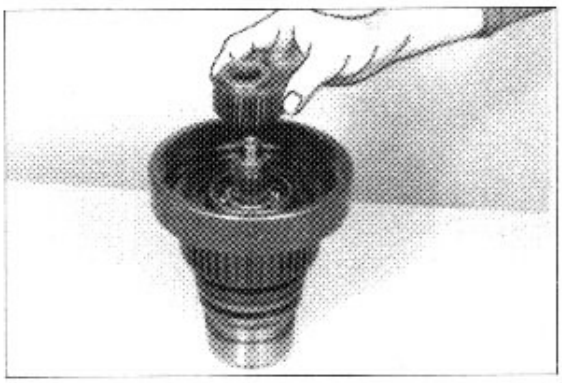
(15) Remove clutch unit.



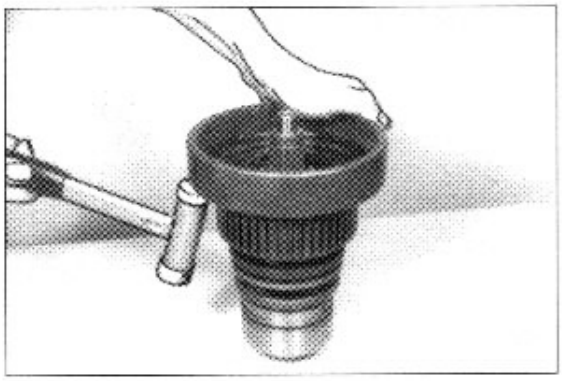
(16) Fix sun gear axially by means of assembly jig, squeeze out circlip and relax the cup spring pack.



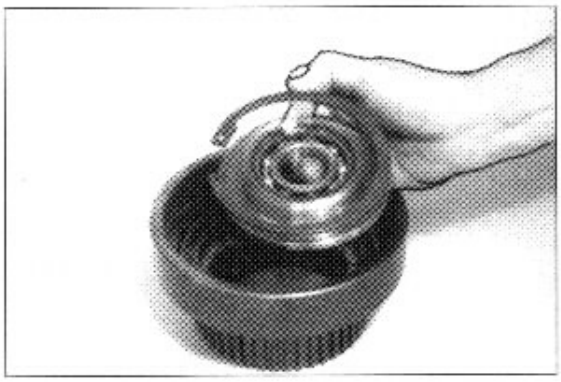
(17) Remove released disk and sun gear.



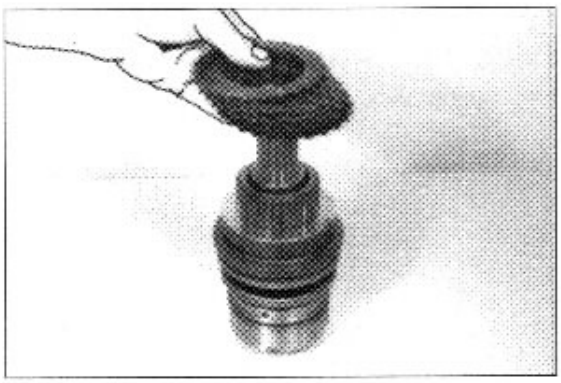
(18) Separate internal gear from drive shaft.



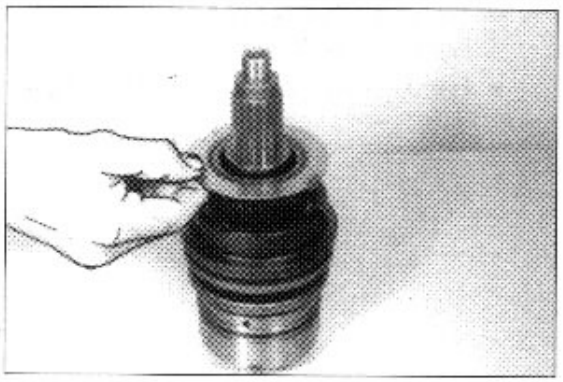
(19) Squeeze out circlip and remove centering disk.



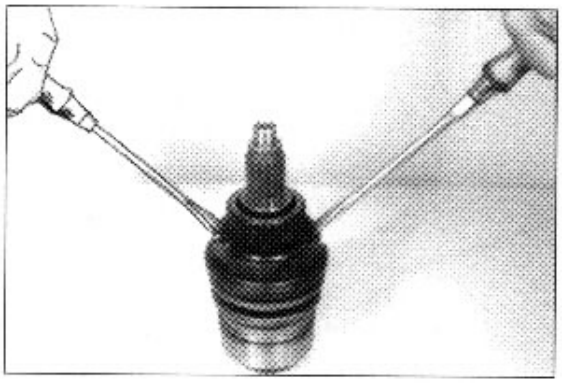
(20) Remove plate pack.



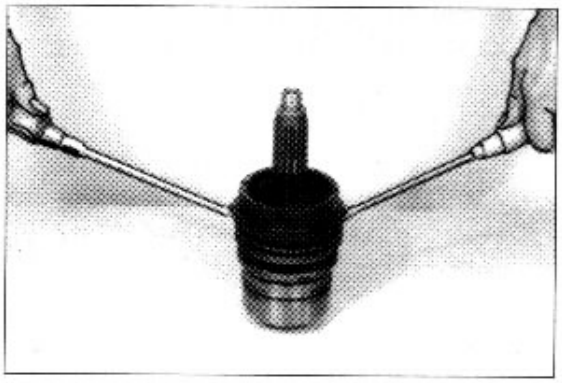
(21) Remove plate.



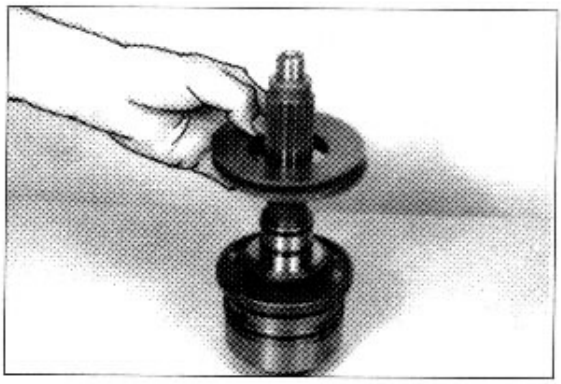
(22) Pry inner plate carrier out of the piston.



(23) Pry off piston from the drive shaft.

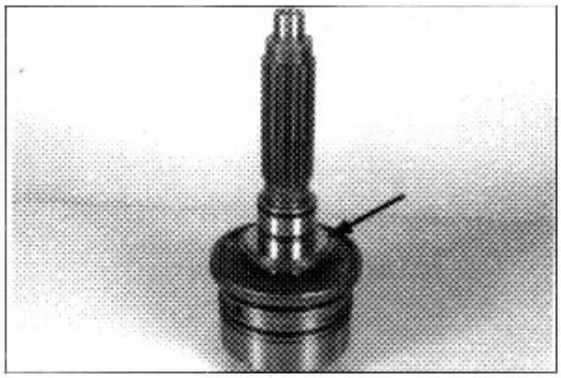


(24) Remove cup spring pack.

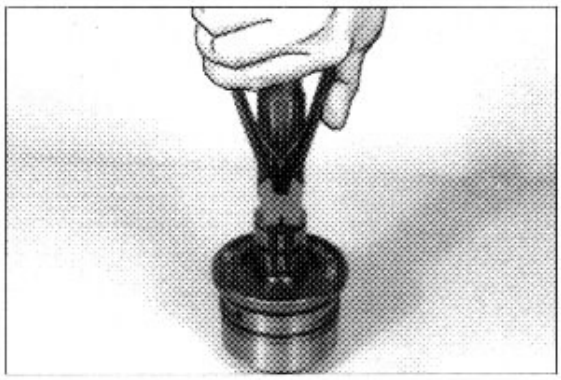


(25) Remove seal ring and O-ring.
Remove disk(Arrow).

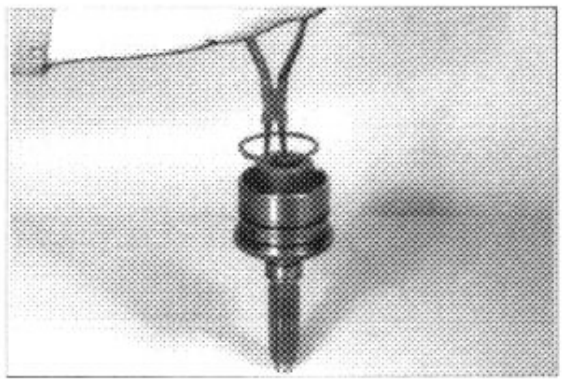
※ Renew sealing components at any rate.



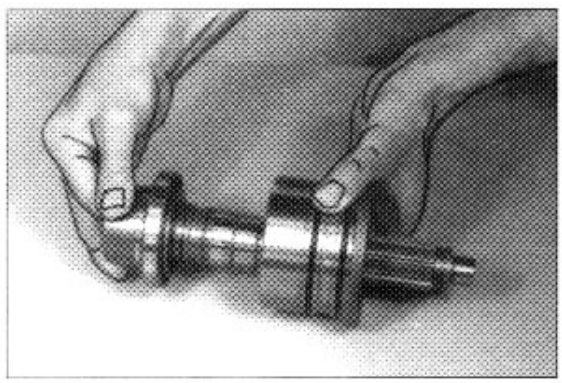
(26) Squeeze out circlip.



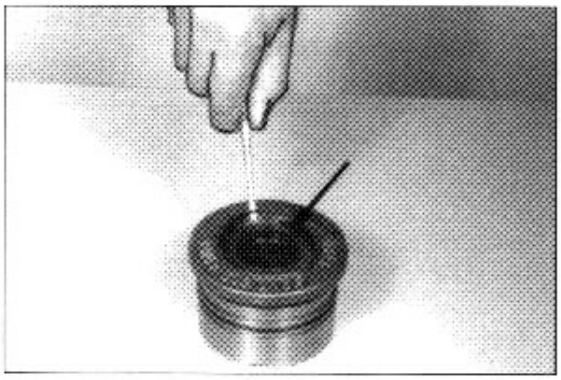
(27) Remove circlip from the ring groove of the guide bush(ø 85mm).



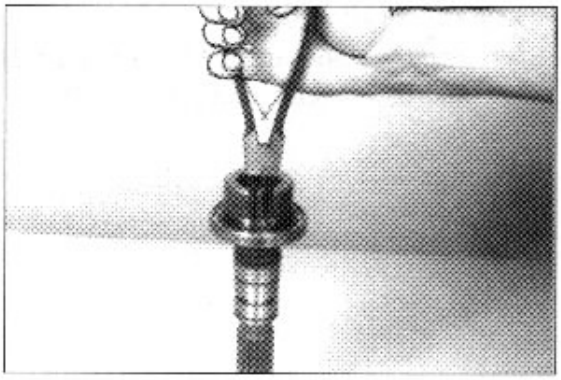
(28) Separate guide bush from drive shaft.



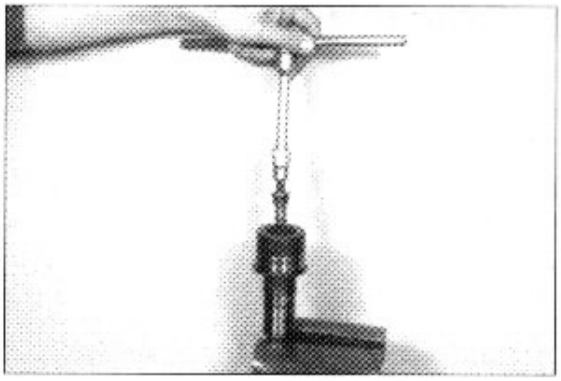
(29) Squeeze out snap ring and remove shaft seal(Arrow).



(30) Squeeze out circlip and press bearing from shaft.

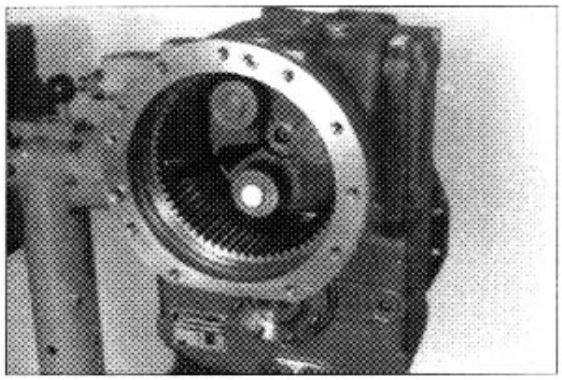


(31) Remove throttle valve.

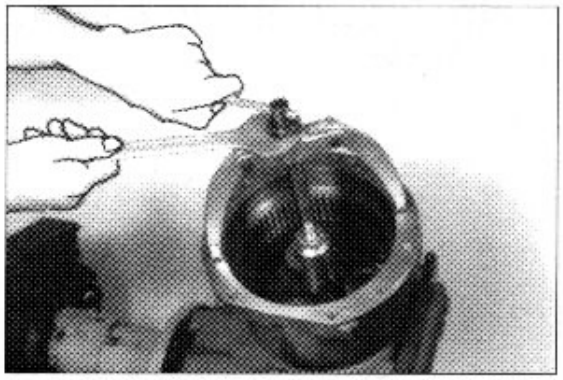


2) REMOVE AND DISASSEMBLE PLANETARY DRIVE

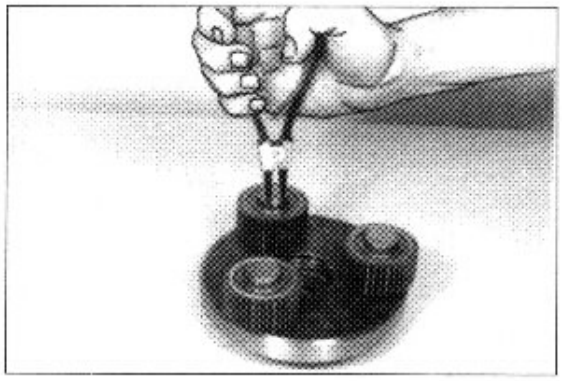
(1) Squeeze out circlip(Arrow).



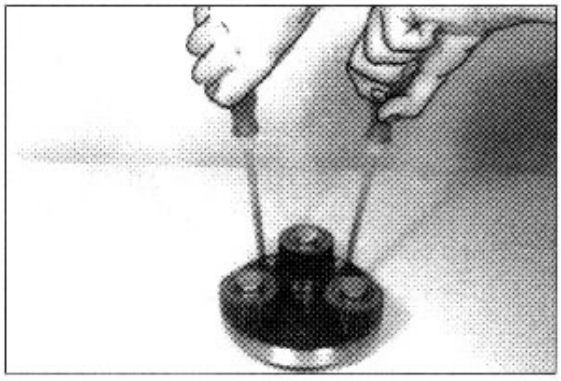
(2) Tilt housing for 90°.
Separate and remove planetary carrier from helical gear, using internal puller.



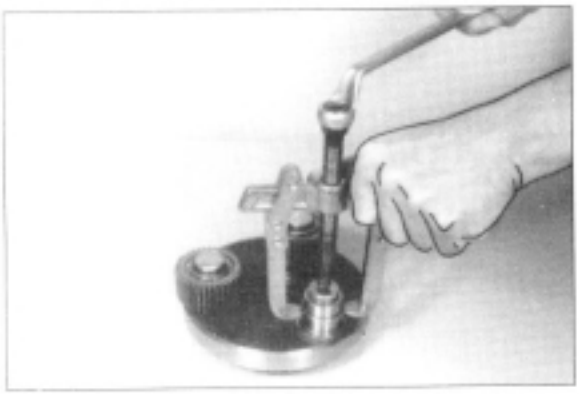
(3) Squeeze out circlip.



(4) Pry off planetary gear from planetary shaft, using offset screw driver.
Remove released components.



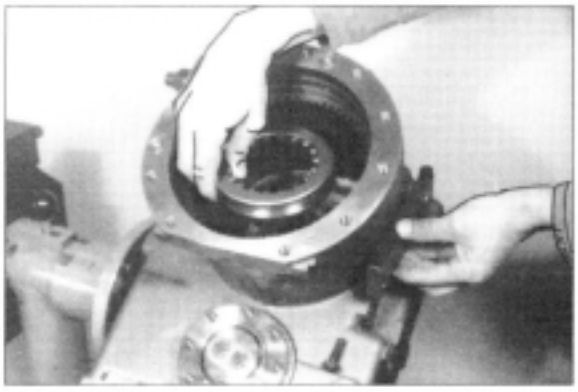
(5) Pull off bearing inner race.



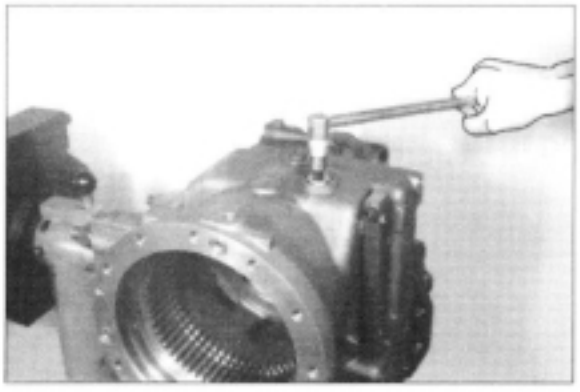
(6) Squeeze out circlip and remove ball bearing.

3) REMOVE AND DISASSEMBLE DECLUTCH UNIT AND SPUR GEAR

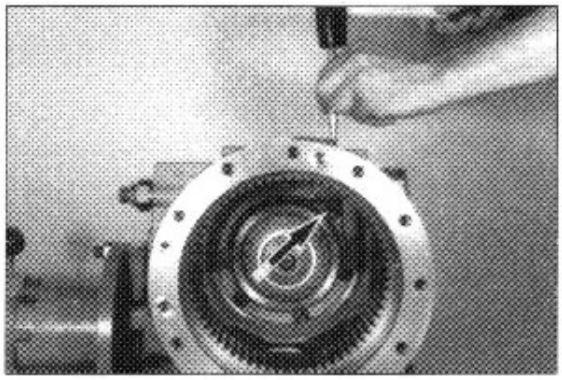
(1) Loosen hex head screw(shift lever locking) and remove sliding collar along with sliding blocks.



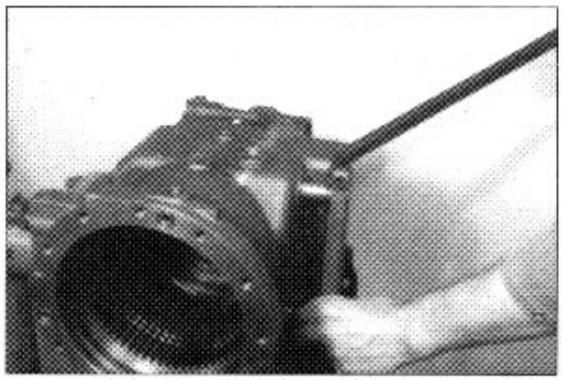
(2) Loosen screw plug.



(3) Drive out roll pin(Arrow).

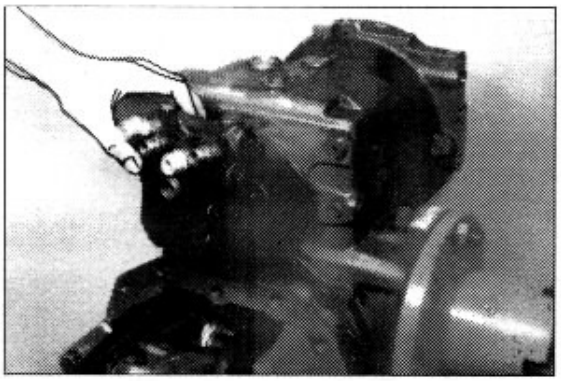


(4) Pry shift lever out of the housing bore and remove released shift fork.

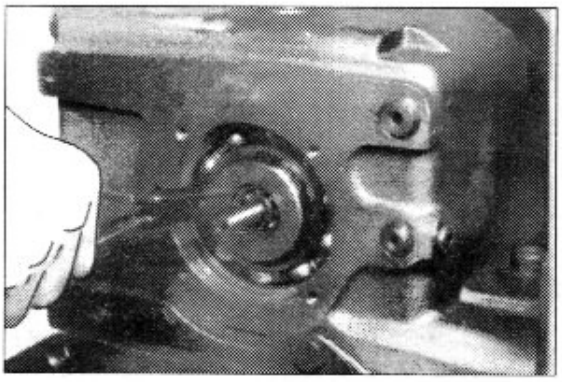


(5) Remove suction line.

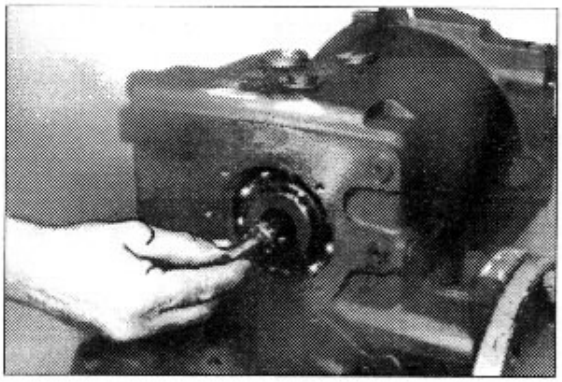
(6) Loosen socket head screws and separate shift lock from housing.



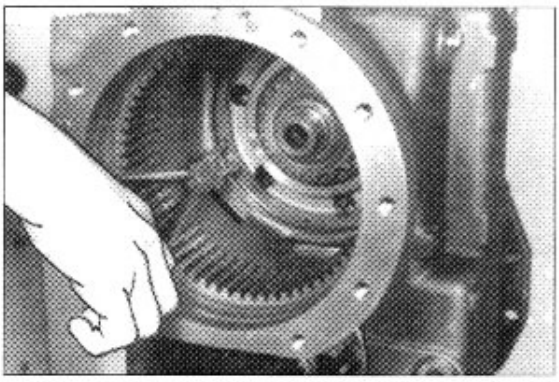
(7) Squeeze out circlip.



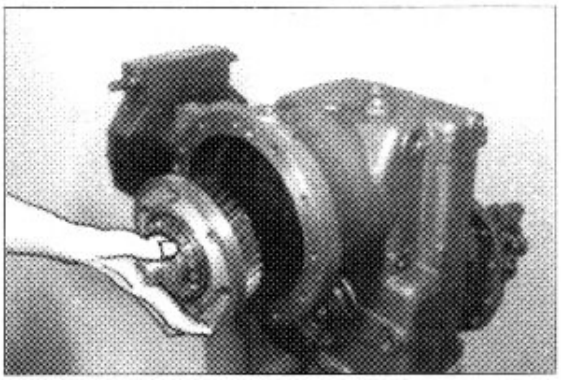
(8) Remove pump shaft.



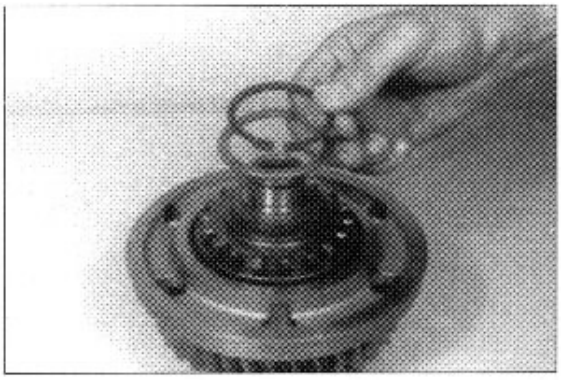
(9) Squeeze out circlip.



(10) Pry off helical gear and take it out of the housing.

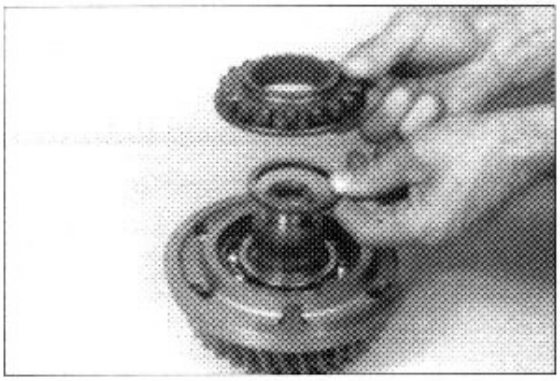


(11) Squeeze out circlip and remove shim.

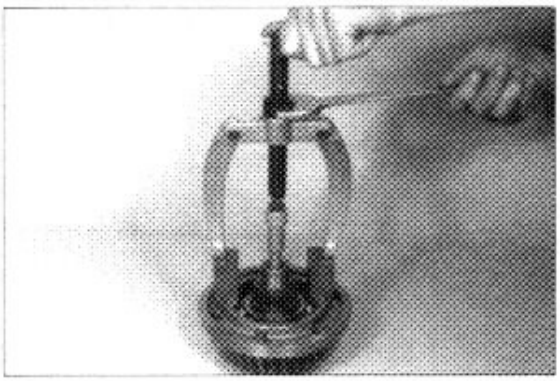


(12) Remove shift dog and spacer.

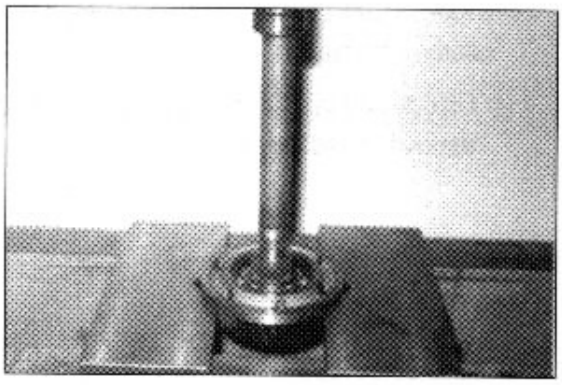
※ According to the design, with or without spacer, see Parts manual.



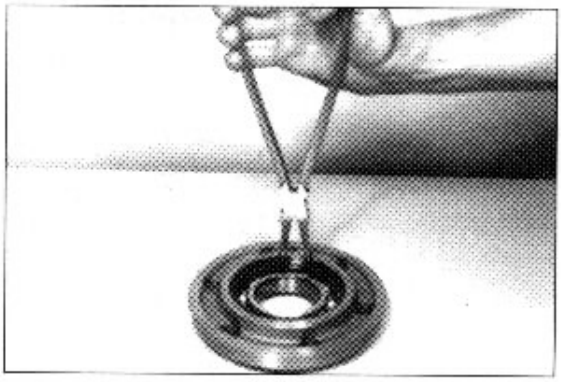
(13) Pull needle bearing out of the housing bore, using internal puller.



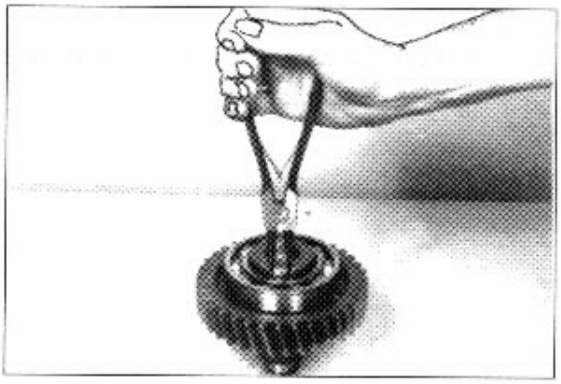
(14) Press helical gear from bearing cap.



(15) Squeeze out circlip and press ball bearing out of the bearing cap.



(16) Squeeze out circlip.



(17) Pry off ball bearing from helical gear collar.