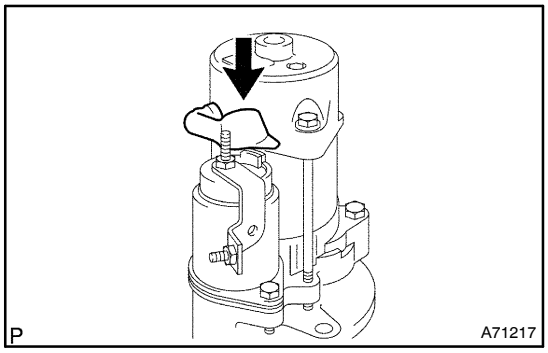
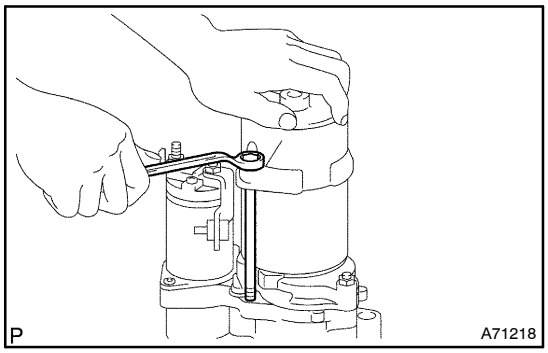
190KG–01

OVERHAUL



1. REMOVE STARTER YOKE ASSY

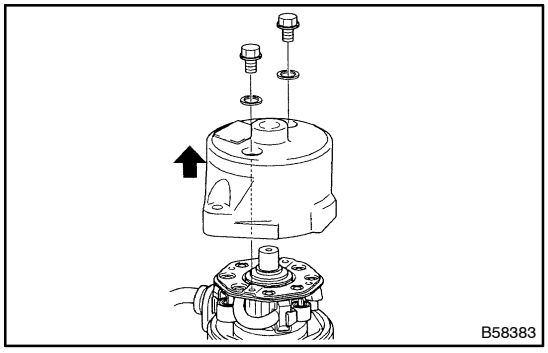
(a) Remove the cap, nut and lead wire.



(b) Remove the 2 through bolts, and pull out the starter yoke together with the armature.

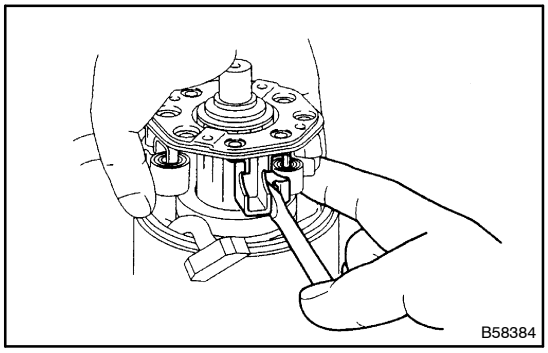
HINT:

Hold the starter by hand so that it will not fall.



2. REMOVE STARTER COMMUTATOR END FRAME ASSY

(a) Remove the 2 screws, commutator end frame and O–ring.



3. REMOVE STARTER BRUSH HOLDER ASSY

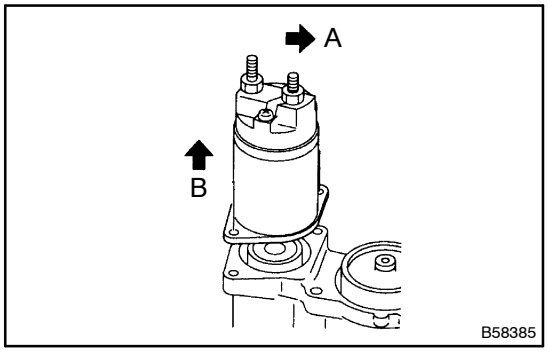
(a) Using a screwdriver, hold the spring tank back and disconnect the brush from the brush holder.

(b) Disconnect the 4 brushes, and remove the brush holder.

4. REMOVE STARTER ARMATURE ASSY

(a) Remove the armature from the starter yoke assy.

(b) Remove the felt and washer from the armature.



5. REMOVE MAGNET STARTER SWITCH ASSY

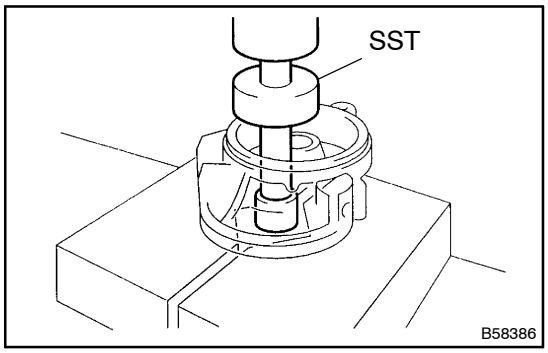
(a) Loosen the 2 bolts holding the magnet switch to the drive housing.

(b) Pull out the magnet switch in direction B by tilting the upper part of the main switch in direction A, as shown in the illustration.

6. REMOVE MOTOR HOUSING

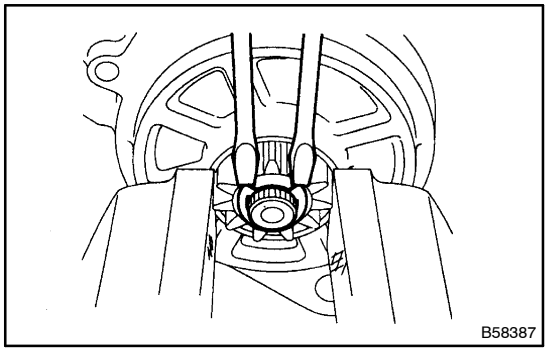
(a) Remove the bolt and motor housing.

(b) Remove the plate, spring and rubber seal from the drive housing.



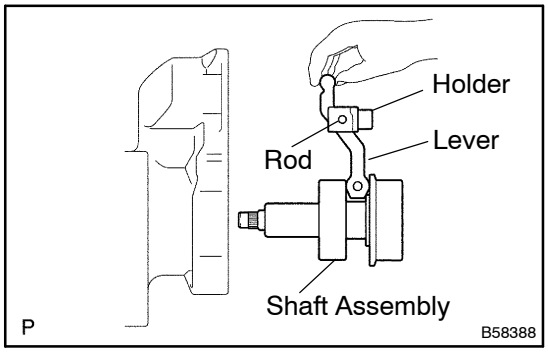
7. REMOVE ARMATURE BEARING

(a) Using SST and a press, remove the bearing from the motor housing.
SST 09820–00031



8. REMOVE PINION GEAR

(a) Using 2 screwdrivers, remove the snap ring and pinion gear.



9. REMOVE STARTER CLUTCH SUB–ASSY

(a) Remove the starter clutch together with the drive lever from the starter drive housing.

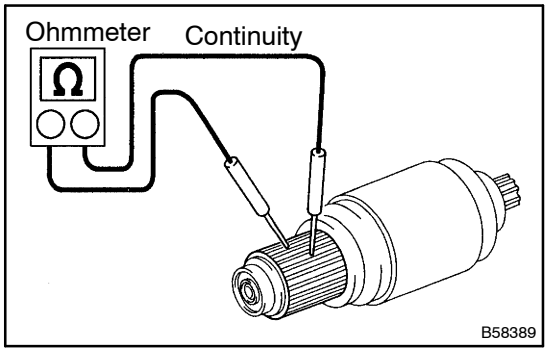
10. REMOVE STARTER PINION DRIVE LEVER

(a) Remove the lever and shaft assembly simultaneously from the pinion case.

(b) Pull out the rod and remove the holder from the lever.

11. REMOVE STARTER DUST PROTECTOR

(a) Remove the protector by prying it with a screwdriver.



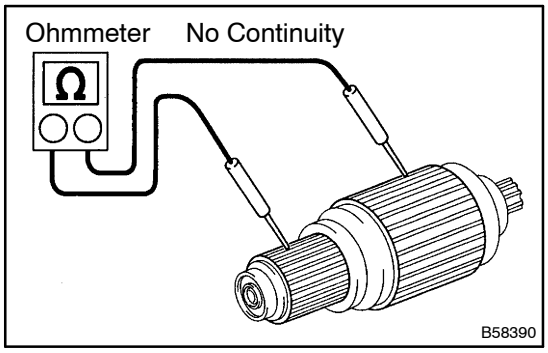
12. INSPECT STARTER ARMATURE ASSY

If the surface of the commutator is dirty or burned, polish the part with sandpaper (#400) or replace the armature assy.

(a) Check the commutator open circuit.

(1) Using an ohmmeter, check that there is continuity between the segments of the commutator.

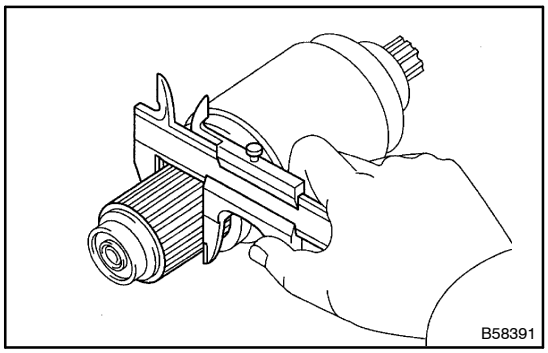
If there is no continuity between any segment, replace the armature assy.



(b) Check the commutator ground.

(1) Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.

If there is continuity, replace the armatureassy.



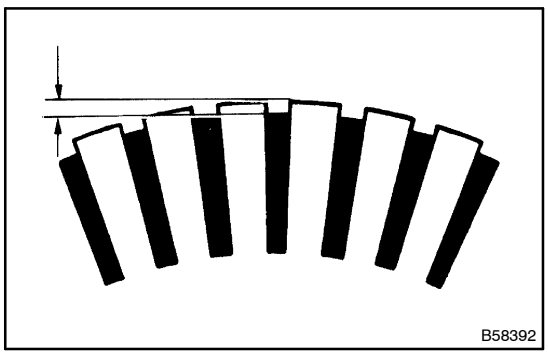
(c) Check the commutator diameter.

(1) Using vernier calipers, measure the commutator diameter.

Standard diameter: 32.8 mm (1.291 in.)

Minimum diameter: 30.0 mm (1.181 in.)

If the diameter is less than the minimum, replace the armature assy.



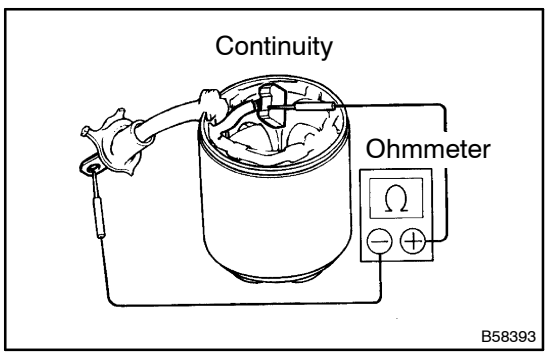
(d) Measure the undercut depth of the commutator.

Standard undercut depth:

0.5 – 0.8 mm (0.020 – 0.032 in.)

Minimum undercut depth: 0.2 mm (0.008 in.)

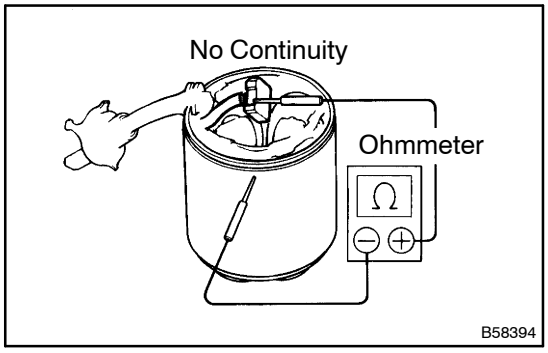
If the undercut depth is less than the minimum, correct it with a hacksaw blade.



13. INSPECT STARTER YOKE ASSY

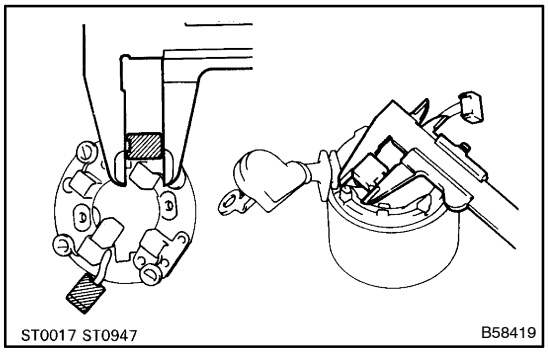
(a) Using an ohmmeter, check that there is continuity between the lead wire and the brush.

If there is no continuity, replace the starter yoke assy.



(b) Inspect for ground.
(1) Using an ohmmeter, check that there is no continuity between the brush and the starter yoke body.

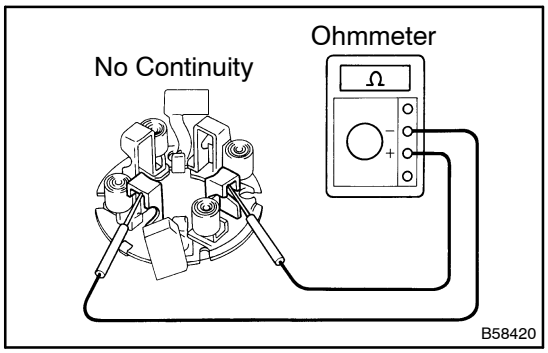
If there is continuity, repair or replace the starter yoke assy.



14. INSPECT BRUSH

(a) Using vernier calipers, measure the brush length.
Standard brush length: 18.0 mm (0.709 in.)
Minminum brush length: 12.0 mm (0.472 in.)

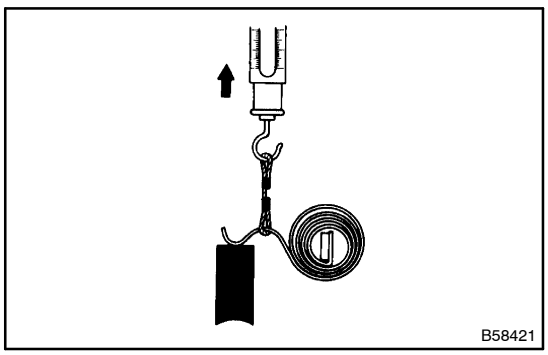
If the length is less than the minimum, replace the brush holder and starter yoke assy.



15. INSPECT STARTER BRUSH HOLDER ASSY

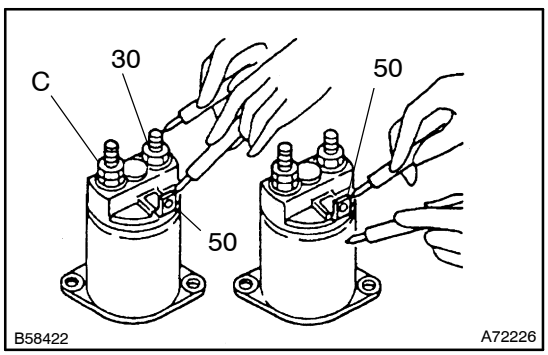
(a) Using an ohmmeter, check that there is no continuity between the positive (+) and negative (–) brush holders.

If there is continuity, repair or replace the brush holder assy.



(b) Take the pull scale reading the instant brush spring separates from the brush.
Standard installed load:
42.2 – 51.0 N (4.3 – 5.2 kgf, 9.3 – 11.2 lbf)
Minimum installed load: 22.5 N (2.3 kgf, 4.9 lbf)

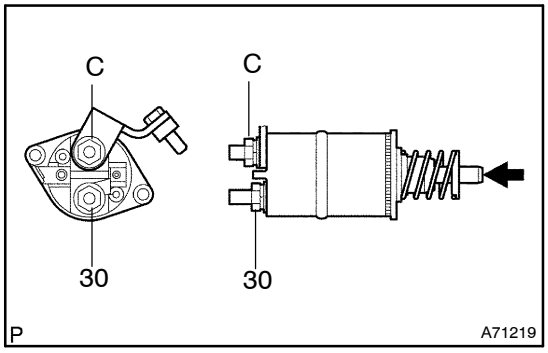
If the installed load is less than the minimum, replace the brush springs.



16. INSPECT MAGNET STARTER SWITCH ASSY

(a) Inspect the pull–in coil.
Using an ohmmeter, check that there is resistance between terminals 30 and 50.
Standard resistance: 0.12 – 0.15 Ω

(b) Inspect the hold–in coil.
Using an ohmmeter, check that there is resistance between terminal 50 and the switch body.
Standard resistance: 0.83 – 1.01 Ω

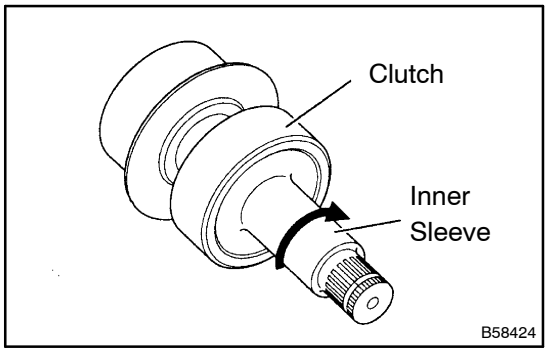


(c) Using an ohmmeter, check that there is no continuity between terminal C and 30.

If there is continuity, replace the magnet switch assy.

(d) Push the main switch assembly, when using an ohmmeter, check that there is continuity between terminal C and 30.

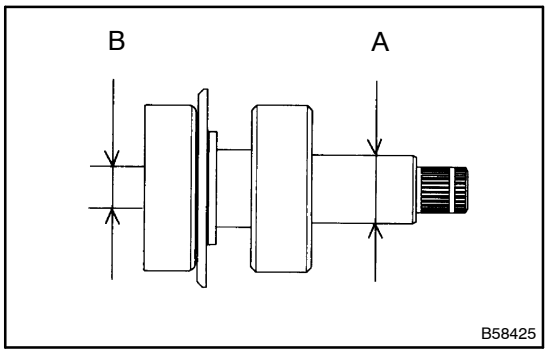
If there is no continuity, replace the magnet switch assy.



17. INSPECT STARTER CLUTCH SUB–ASSY

(a) With the clutch fixed, turn only the inner sleeve right and left.

(b) Check that the inner sleeve turns lightly in the arrow mark direction but does not turn in the opposite direction.



(c) Using a micrometer, check each outside diameter of the starter clutch.

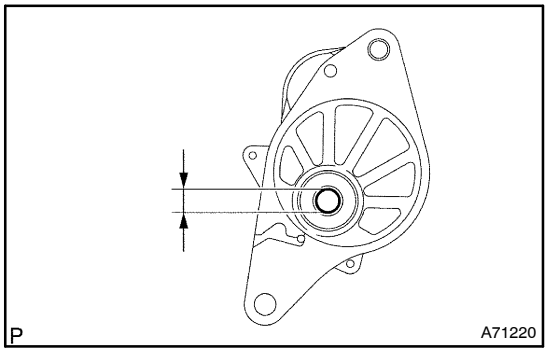
Standard diameter:

A	26.0 mm (1.024 in.)
B	12.1 mm (0.476 in.)

Minimum diameter:

A	25.88 mm (1.019 in.)
B	12.0 mm (0.472 in.)

If the diameter is less than minimum, replace the starter clutch assy.



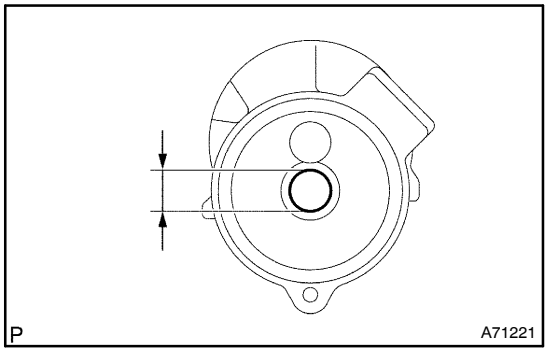
18. INSPECT DRIVE HOUSING

(a) Using a cylinder gauge, check the inside diameter of the drive housing bush.

Standard diameter: 26.0 mm (1.024 in.)

Maximum diameter: 26.2 mm (1.031 in.)

If the diameter is greater than maximum, replace the drive housing.



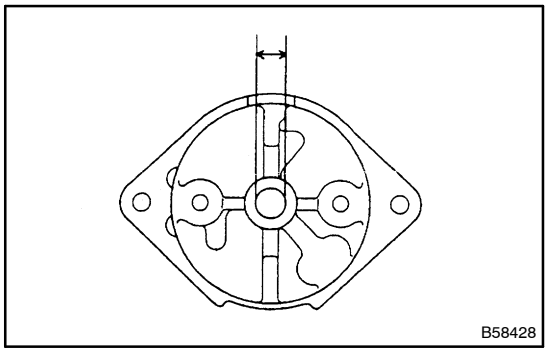
19. INSPECT MOTOR HOUSING

(a) Using a cylinder gauge, check the inside diameter of the motor housing bush.

Standard diameter: 12.1 mm (0.476 in.)

Maximum diameter: 12.3 mm (0.484 in.)

If the diameter is greater than maximum, replace the motor housing.



20. INSPECT STARTER COMMUTATOR END FRAME ASSY

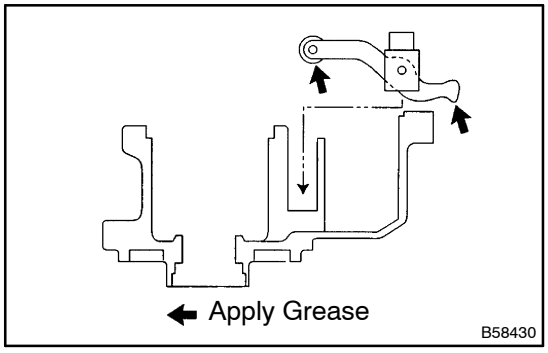
(a) Using a cylinder gauge, check the inside diameter of the end frame bush.

Standard diameter: 12.0 mm (0.472 in.)

Maximum diameter: 12.2 mm (0.480 in.)

If the diameter is greater than maximum, replace the commutator end frame assy.

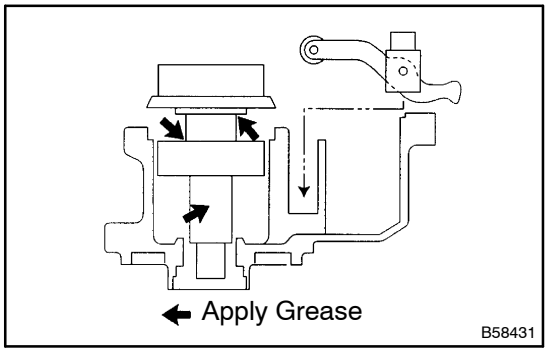
21. INSTALL STARTER DUST PROTECTOR



22. INSTALL STARTER PINION DRIVE LEVER

(a) Install the holder to the drive lever with a pin.

(b) Apply grease to the portions of the drive lever.

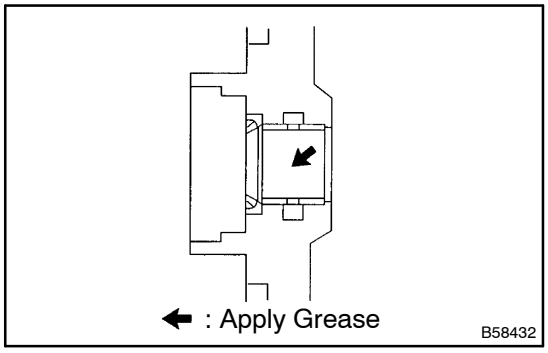


23. INSTALL STARTER CLUTCH SUB–ASSY

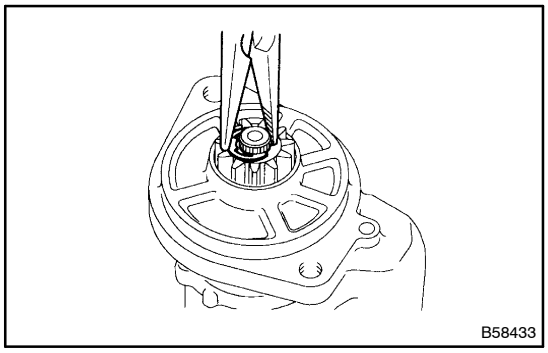
(a) Apply grease to the portions of the starter clutch, and install the drive lever together with it to the starter drive housing.

HINT:

Check that the starter clutch is in the depth, then lightly slides there.

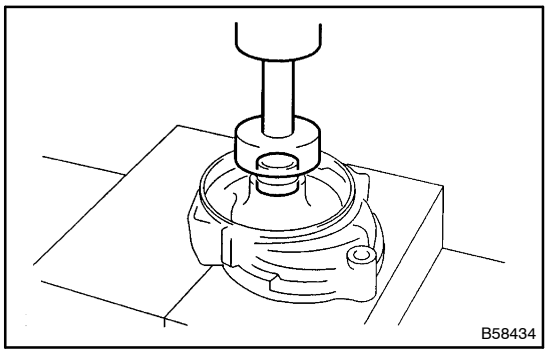


(b) Apply much grease to the extent that it would overflow from the reservoir of the start drive housing.



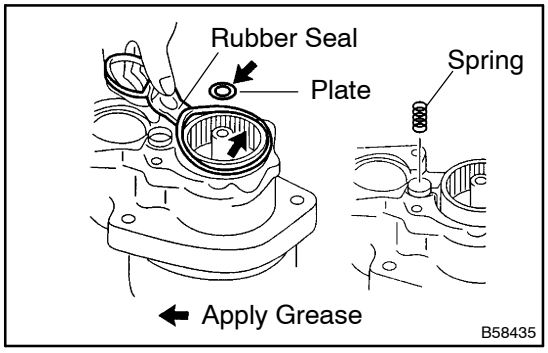
24. INSTALL PINION GEAR

(a) Install the pinion gear and new snap ring.



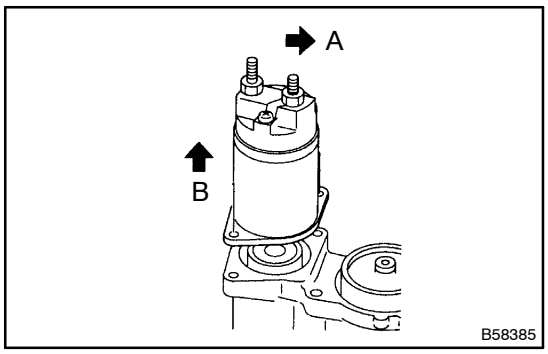
25. INSTALL ARMATURE BEARING

(a) Using a press, install the bearing.



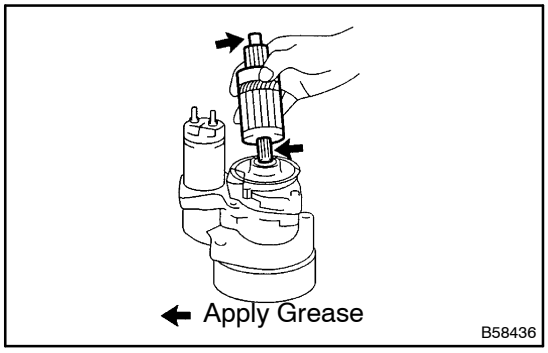
26. INSTALL MOTOR HOUSING

(a) Apply grease to the parts as shown in illustration.
(b) Install a new rubber seal, spring and plate.
(c) Install the bolt and motor housing.
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)



27. INSTALL MAGNET STARTER SWITCH ASSY

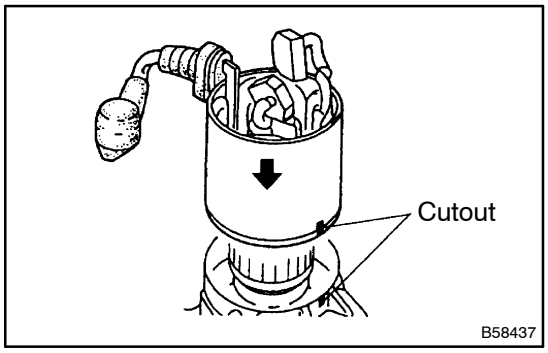
(a) Attach the drive lever to the upper port of the main switch, in the direction A, then install it with the 2 bolts by inserting it the direction B.
Torque: 14.7 N·m (150 kgf·cm, 11 ft·lbf)



28. INSTALL STARTER ARMATURE ASSY

(a) Apply grease to the portions of the armature as shown in illustration.

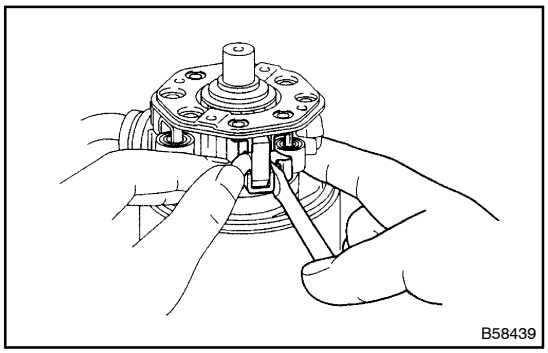
(b) Install the armature to the motor housing.



29. INSTALL STARTER YOKE ASSY

(a) Align the cutout of the starter yoke with the cutout of the motor housing.

(b) Install the starter yoke.



30. INSTALL STARTER BRUSH HOLDER ASSY

(a) Place the brush holder on the armature.

(b) Using a screwdriver, hold the brush spring back, and connect the brush into the brush holder. Connect the 4 brushes.

31. INSTALL STARTER COMMUTATOR END FRAME ASSY

(a) Install the end frame and the 2 through bolts.
Torque: 14.7 N·m (150 kgf·cm, 11 ft·lbf)

(b) Install 2 new O–rings and the 2 screws to the end frame.
Torque: 4.3 N·m (44 kgf·cm, 38 in.·lbf)