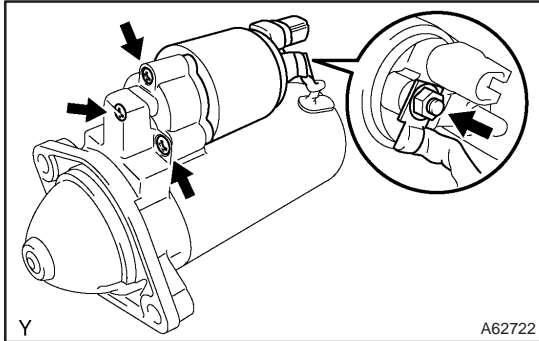
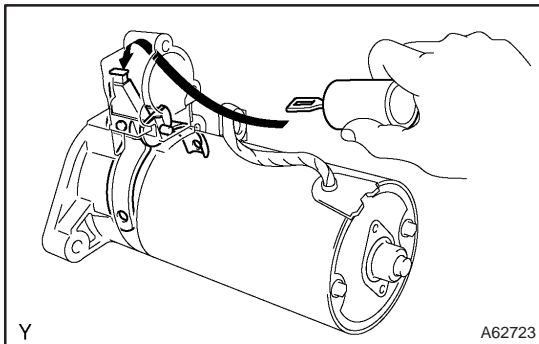


## OVERHAUL

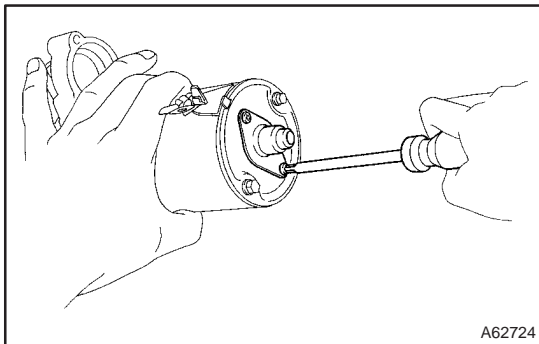


## 1. REMOVE MAGNET STARTER SWITCH ASSY

- (a) Remove the nut, and disconnect lead wire from the magnet starter switch terminal.
- (b) Remove the 3 screws, magnet starter switch and return spring.

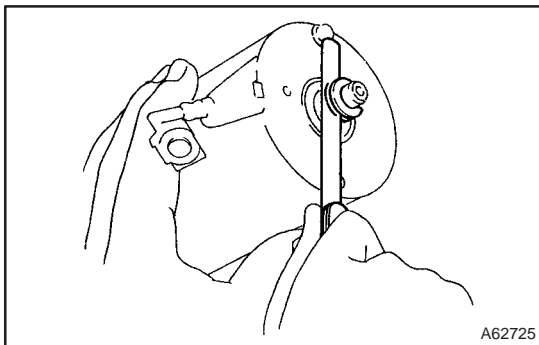


- (c) Pull the plunger, and disconnect the plunger hook from the upper side of the drive lever.



## 2. REMOVE STARTER COMMUTATOR END FRAM COVER

- (a) Remove the 2 screws and end fram cover.



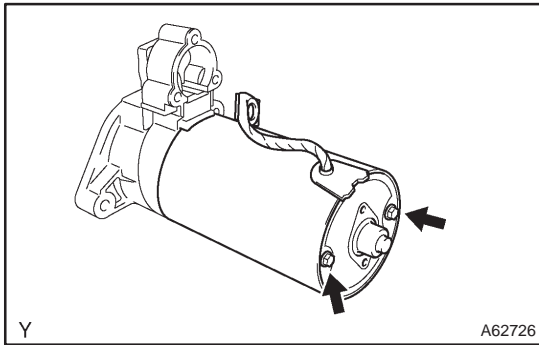
- (b) Using a feeler gauge, measure the armature thrust clearance between the lock plate and end frame.

**Standard thrust clearance: 0.3 mm (0.012 in.)**

**Maximum thrust clearance: 0.6 mm (0.024 in.)**

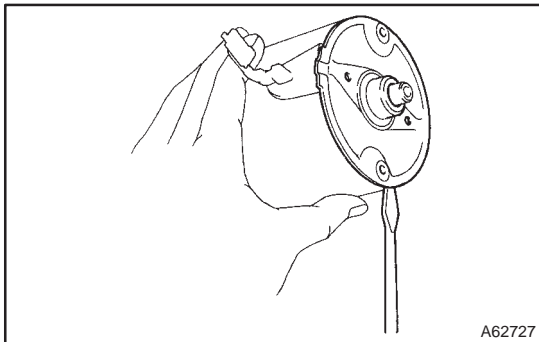
If the thrust clearance is greater than maximum, replace the thrust washer.

- (c) Remove the lock plate and thrust washer.



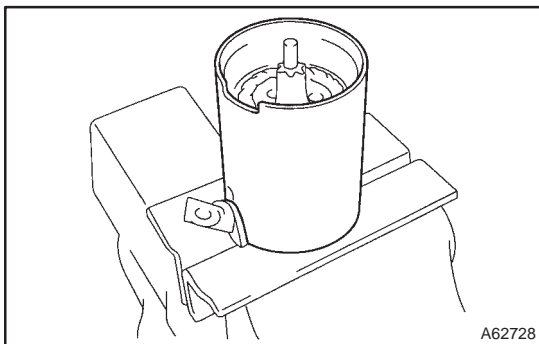
### 3. REMOVE STARTER YOKE ASSY

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



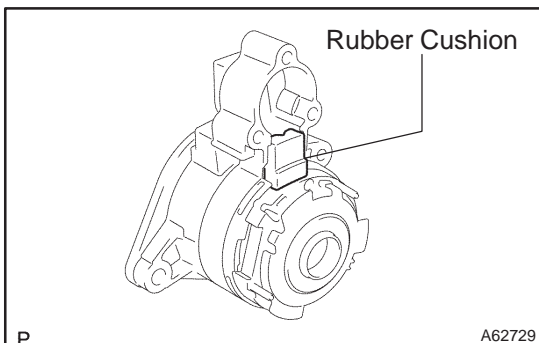
### 4. REMOVE STARTER COMMUTATOR END FRAM ASSY

- (a) Using a screwdriver, pry out the commutator end frame.



### 5. REMOVE STARTER ARMATURE ASSY

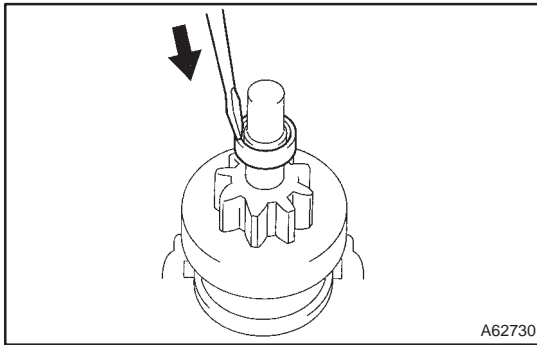
### 6. REMOVE STARTER BRUSH HOLDER ASSY



### 7. REMOVE PLANET CARRIER SHAFT SUB-ASSY

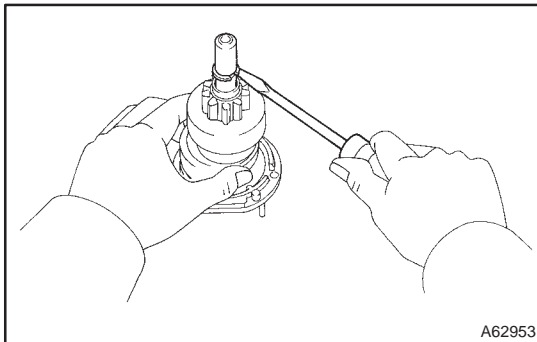
- (a) Remove the rubber cushion.  
(b) Remove the planet carrier shaft and starter clutch assembly.

### 8. REMOVE STARTER PINION DRIVE LEVER

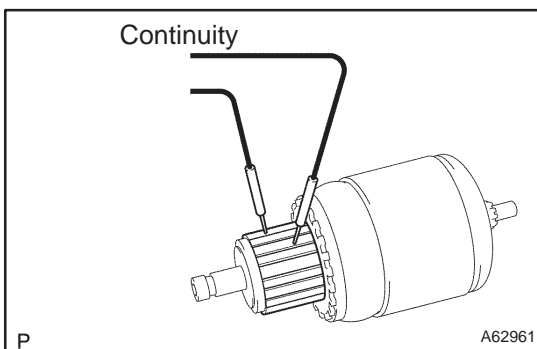


## 9. REMOVE STARTER CLUTCH SUB-ASSY

- (a) Using a screwdriver, tap in the stop collar towards the starter clutch.



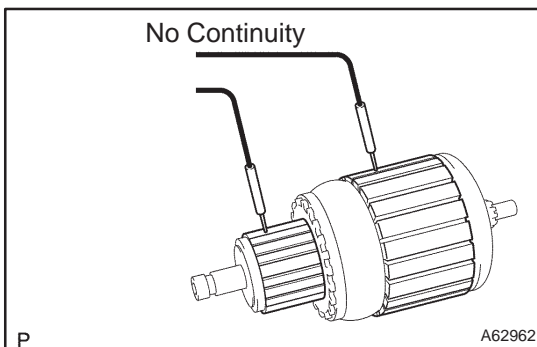
- (b) Using a screwdriver, pry out the snap ring.  
(c) Remove the stop collar from the shaft.



## 10. INSPECT STARTER ARMATURE ASSY

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

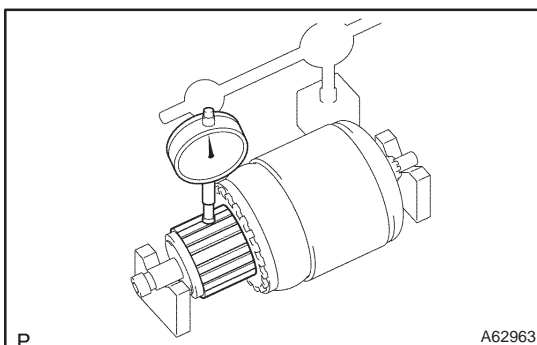
If there is no continuity between any segments, replace the armature.



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

If there is continuity, replace the armature.

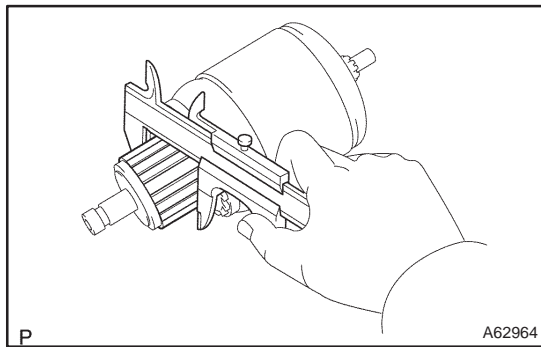
- (c) Check the commutator for the dirty and burnt surface. If the surface is dirty or burnt, correct with sandpaper (No.400) or a lathe.



- (d) Place the commutator on V-blocks.  
(e) Using a dial indicator, measure the circle runout.

**Maximum circle runout: 0.03 mm (0.0012 in.)**

If the circle runout is greater than maximum, correct it on a lathe.

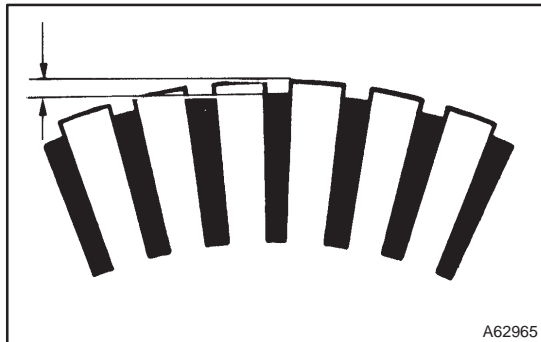


- (f) Using vernier calipers, measure the commutator diameter.

**Standard diameter: 32.3 mm (1.272 in.)**

**Minimum diameter: 30.5 mm (1.201 in.)**

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

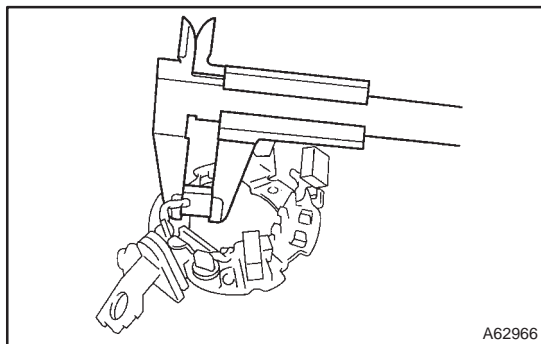


- (g) Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.

**Standard undercut depth: 0.9 mm (0.035 in.)**

**Minimum undercut depth: 0.3 mm (0.012 in.)**

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



#### 11. INSPECT STARTER BRUSH HOLDER ASSY

- (a) Using vernier calipers, measure the brush length.

**Standard length: 14.5 mm (0.571 in.)**

**Minimum length: 9.0 mm (0.354 in.)**

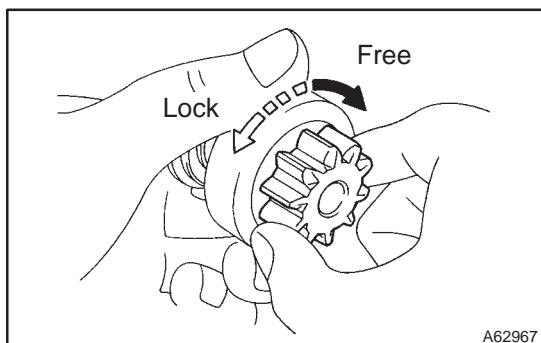
If the length is less than minimum, replace the brush holder.

#### 12. INSPECT STARTER CLUTCH SUB-ASSY

- (a) Check the gear teeth on the starter clutch for wear or damage.

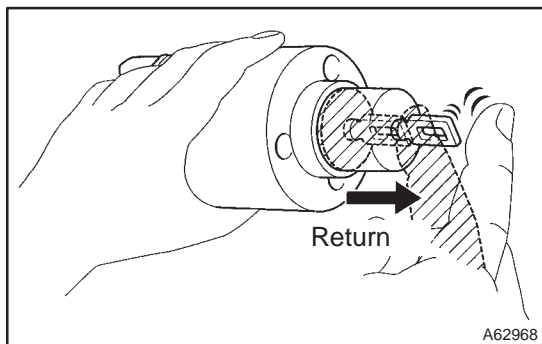
If the gear is damaged, replace it.

If damaged, replace the clutch assembly. If damaged, also check the drive plate ring gear for wear or damage.



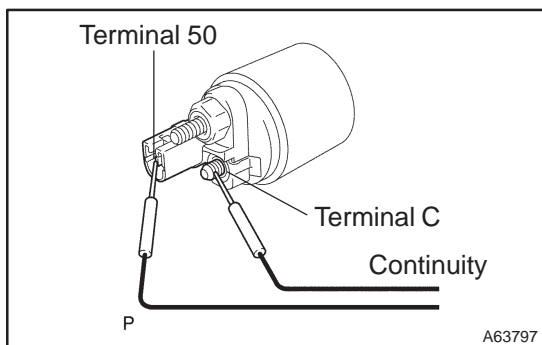
- (b) Rotate the clutch pinion gear clockwise and check that it turns freely. Try to rotate the clutch pinion gear counter-clockwise and check that it locks.

If necessary, replace the starter clutch.

**13. INSPECT MAGNET STARTER SWITCH ASSY**

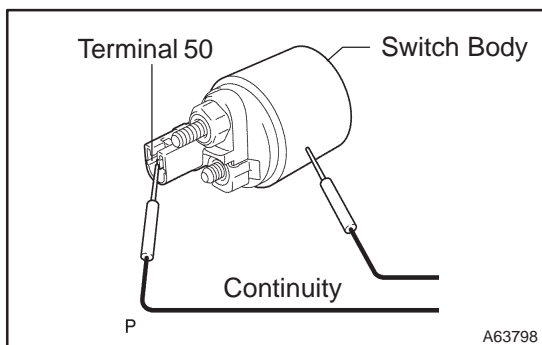
- (a) Push in the plunger and check that it returns quickly to its original position.

If necessary, replace the magnetic switch.



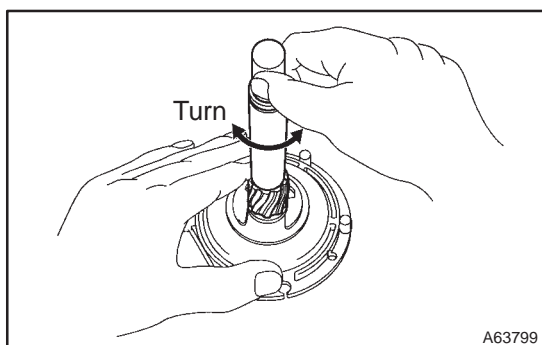
- (b) Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, replace the magnetic switch.



- (c) Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

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

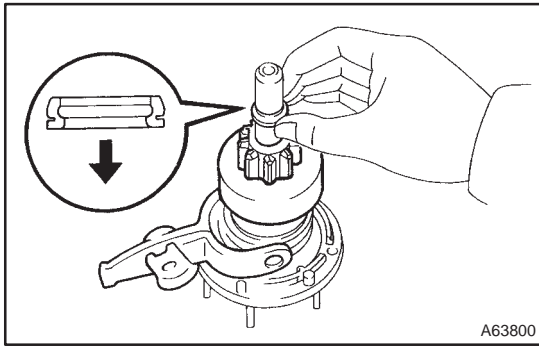
**14. INSPECT PLANET CARRIER SHAFT SUB-ASSY**

- (a) Turn the shaft, and check that it is not rough or worn.

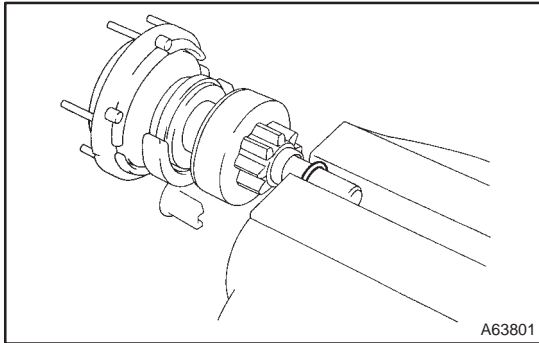
If it feels rough or worn, replace the planet carrier shaft.

**15. INSTALL STARTER PINION DRIVE LEVER****16. INSTALL STARTER CLUTCH SUB-ASSY**

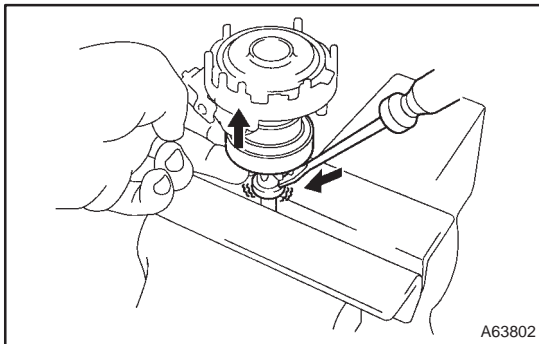
- (a) Apply grease to the bushing and spline of the starter clutch and planet carrier shaft.



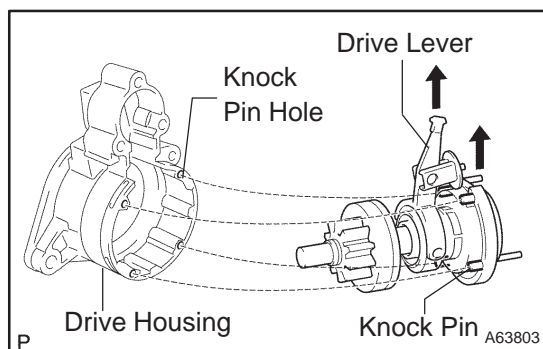
- (b) Place the starter clutch and stop collar on the planet carrier shaft as shown in the illustration.



- (c) Install a new snap ring to the planet carrier shaft groove.  
 (d) Using a vise, compress the snap ring.  
 (e) Check that the snap ring fits correctly.

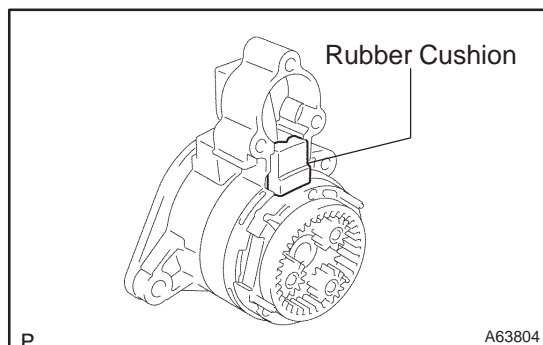


- (f) Using a screwdriver, tap the stop collar to slide it onto the snap ring.

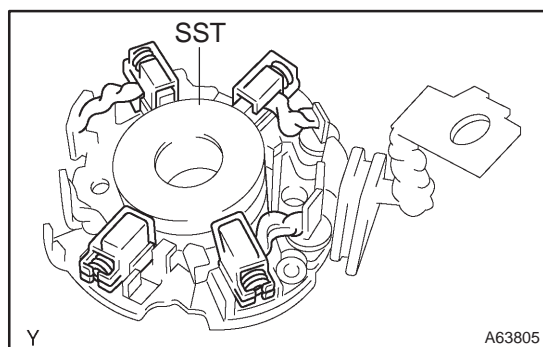


#### 17. INSTALL PLANET CARRIER SHAFT SUB-ASSY

- (a) Set the planet carrier shaft and drive lever in position as shown in the illustration.  
 (b) Align the holes of the drive housing with the knock pins.  
 (c) Install the planet carrier shaft and starter clutch to the drive housing.

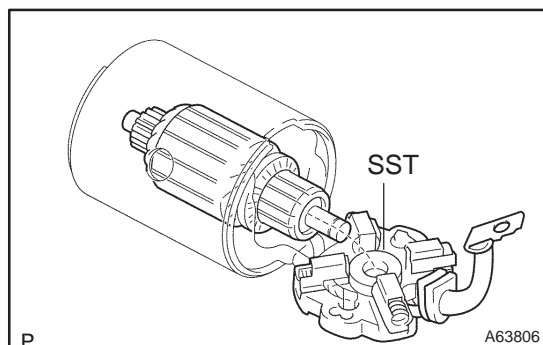


- (d) Install the rubber cushion.

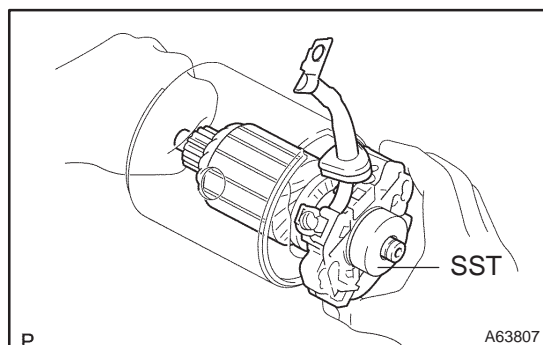


### 18. INSTALL STARTER BRUSH HOLDER ASSY

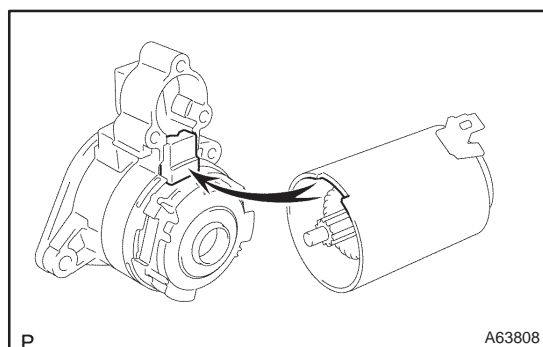
- (a) Install the 4 brush retainers and 4 brush springs to the brush holder.
- (b) Using SST, install the 4 brushes to the brush holder.  
SST 09950-60010 (09951-00340)



- (c) Attach the brush holder to the armature.

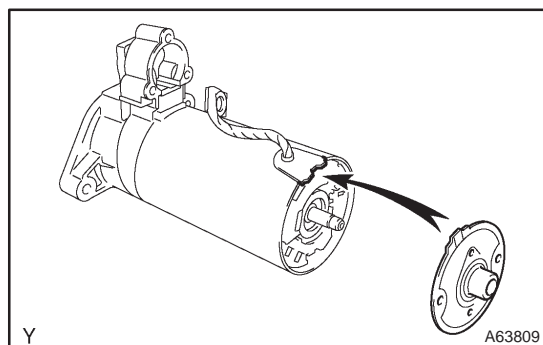


- (d) Push the armature, and remove the SST.

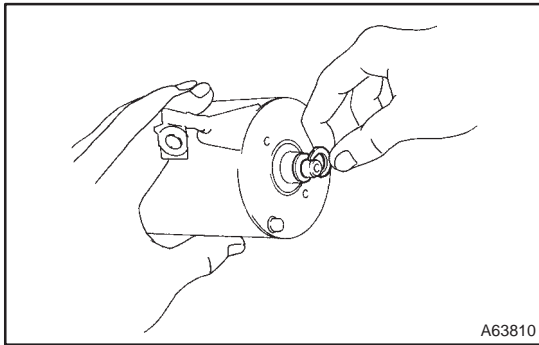


### 19. INSTALL STARTER YOKE ASSY

- (a) Align the cushion rubber on the starter drive housing with the cutout of the starter yoke.
- (b) Install the starter yoke and armature assembly.

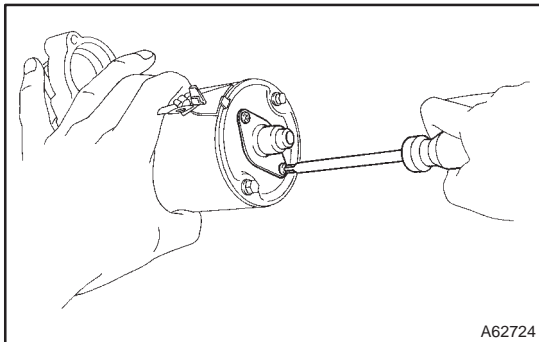


- (c) Align the commutator end frame with the brush holder rubber part as shown in the illustration.
- (d) Install the commutator end frame with the 2 through bolts.  
**6.5 N·m (66 kgf·cm, 58 in.-lbf)**

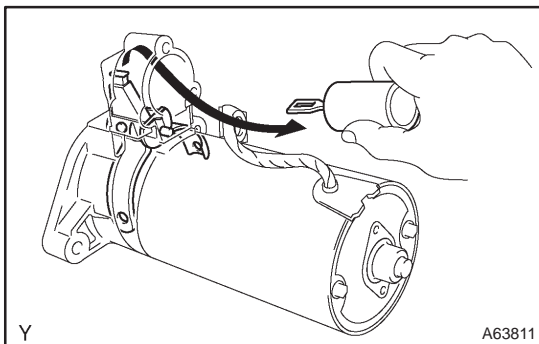


## 20. INSTALL STARTER COMMUTATOR END FRAM COVER

- (a) Install the thrust washer and lock plate.
- (b) Check the armature thrust clearance between the lock plate and the end frame cover. ([See page 19-9](#))

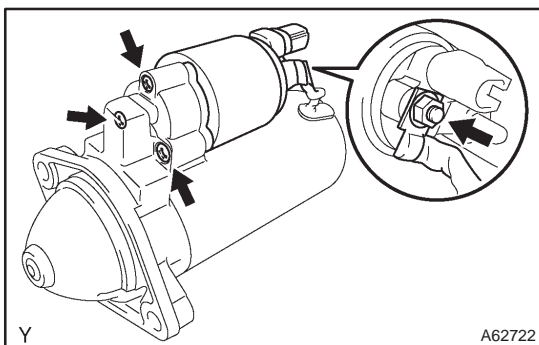


- (c) Pack grease to the commutator end cover.
- (d) Install the commutator end frame cover with the 2 screws.  
**1.7 N-m (17 kgf-cm, 15 in.-lbf)**



## 21. INSTALL MAGNET STARTER SWITCH ASSY

- (a) Hang the plunger hook to the upper side of the drive lever.
- (b) Install the return spring into the plunger.



- (c) Install the return spring and magnet sarter switch with the 3 screws.  
**5.0 N-m (51 kgf-cm, 44 in.-lbf)**
- (d) Connect the lead wire to the magnet starter switch terminal with the nut.  
**8.0 N-m (82 kgf-cm, 71 in.-lbf)**