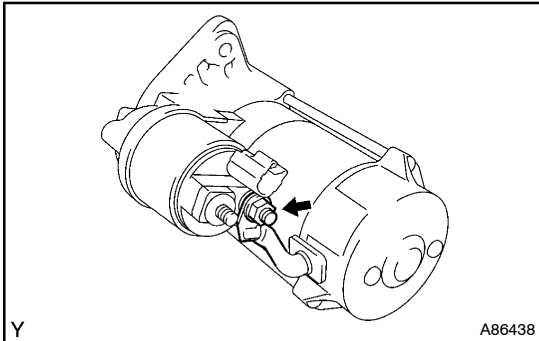
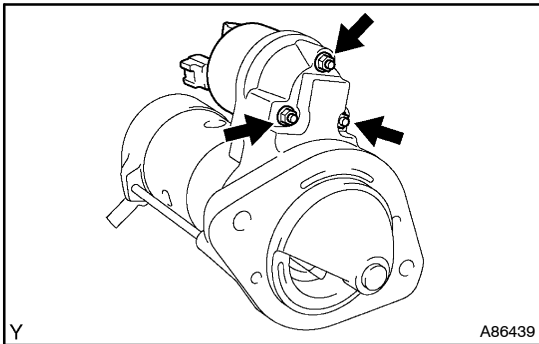


OVERHAUL

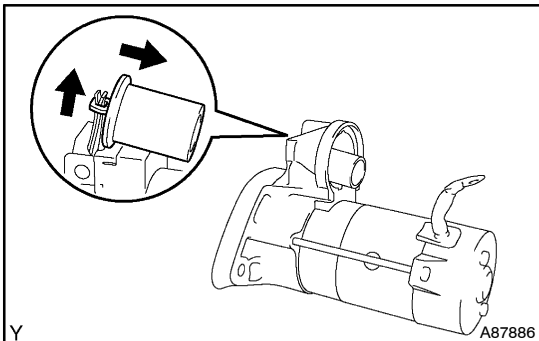


1. REMOVE STARTER MAGNETIC SWITCH ASSY

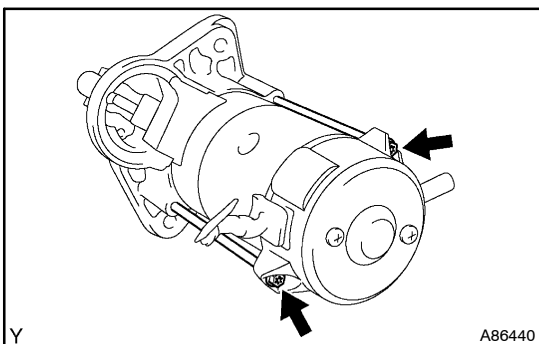
- (a) Remove the nut, then disconnect the lead wire from the starter magnetic switch.



- (b) Remove the 3 nuts and starter magnetic switch.

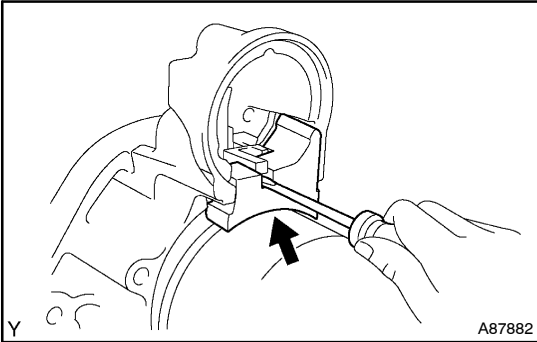


- (c) Pull the plunger, then disconnect the plunger hook from the upper side of the starter pinion drive lever.

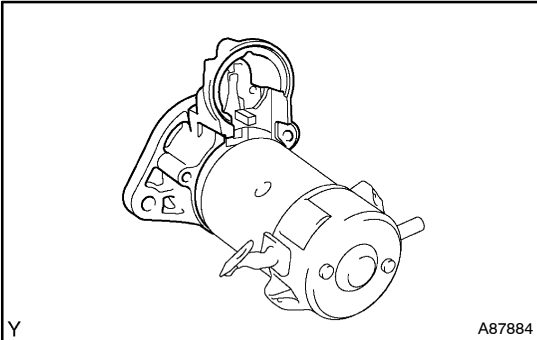


2. REMOVE STARTER DRIVE HOUSING ASSY

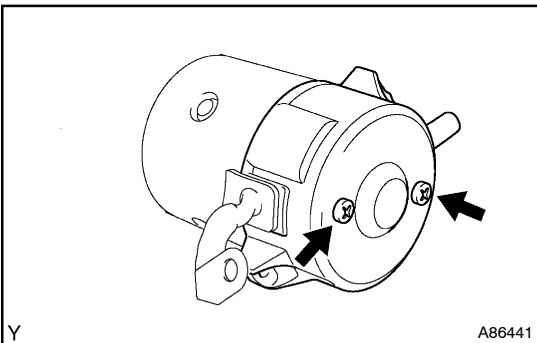
- (a) Using a Torx wrench, remove the 2 bolts.



- (b) Using a screwdriver, remove the rubber seal from the starter pinion drive lever.

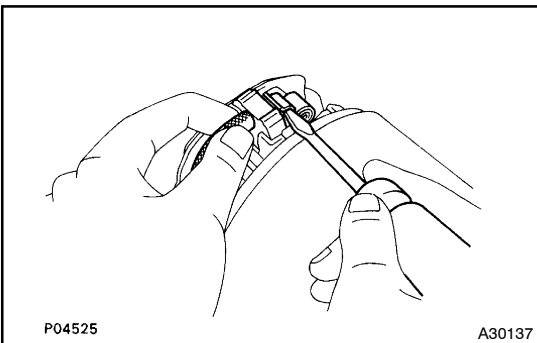


- (c) Remove the starter drive housing from the starter pinion drive lever by separating them at the part fitting surface.
(d) Remove the starter center bearing clutch from the starter yoke.



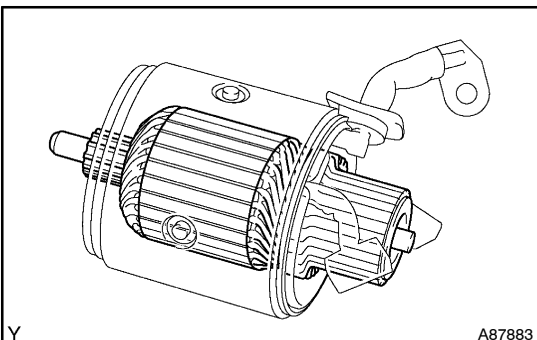
3. REMOVE STARTER COMMUTATOR END FRAME ASSY

- (a) Remove the 2 screws and starter commutator end frame.



4. REMOVE STARTER ARMATURE ASSY

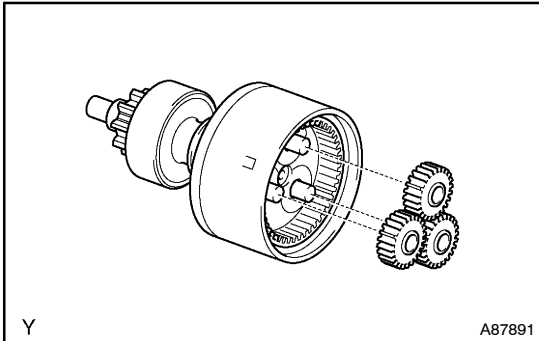
- (a) Using a screwdriver, hold the spring back and disconnect the brush from the brush holder.
(b) Disconnect the 4 brushes, then remove the brush holder.



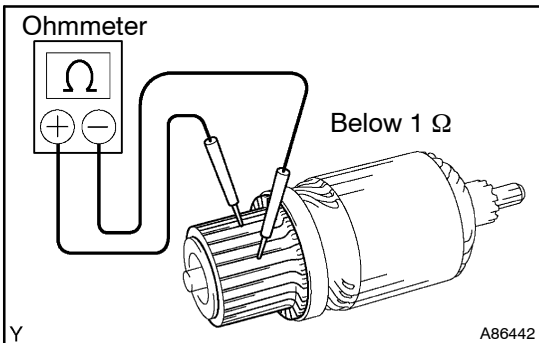
- (c) Remove the starter armature from the starter yoke.

5. REMOVE STARTER ARMATURE PLATE

- (a) Remove the starter armature plate from the starter center bearing clutch.

**6. REMOVE PLANETARY GEAR**

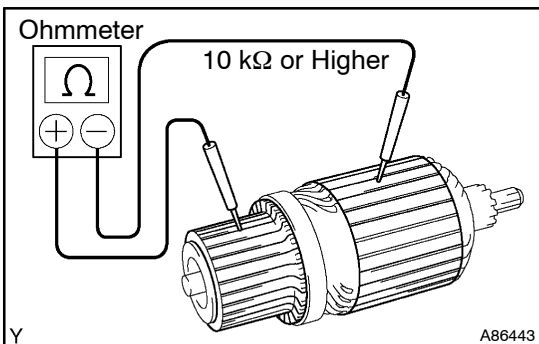
- (a) Remove the 3 planetary gears.

**7. INSPECT STARTER ARMATURE ASSY**

- (a) Inspect the resistance of the commutator.
(1) Using an ohmmeter, measure the resistance between the segments of the commutator.

Standard: Below 1 Ω

If the resistance is not as specified, replace the armature.

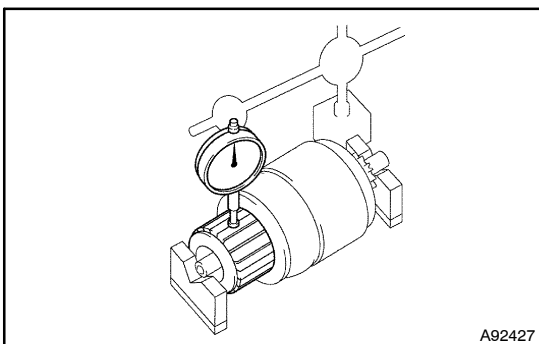


- (2) Using an ohmmeter, measure the resistance between the commutator and armature coil core.

Standard: 10 kΩ or higher

If the resistance is not as specified, replace the armature.

- (b) Check the commutator surface for dirt or burn.
If the surface is dirty or burnt, smooth it with 400-grit sandpaper or on a lathe.

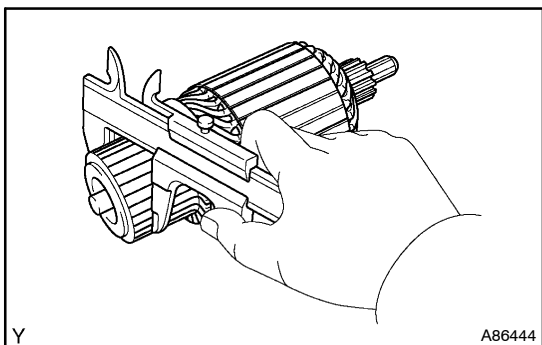


- (c) Check the circle runout of the commutator.

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

Maximum circle runout: 0.05 mm (0.0020 in.)

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

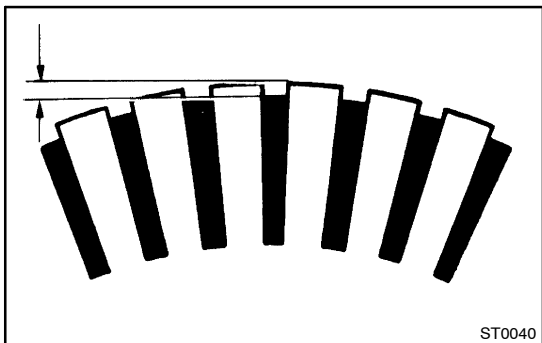


- (d) Using vernier calipers, measure the commutator diameter.

Standard diameter: 35.0 mm (1.378 in.)

Minimum diameter: 34.0 mm (1.339 in.)

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

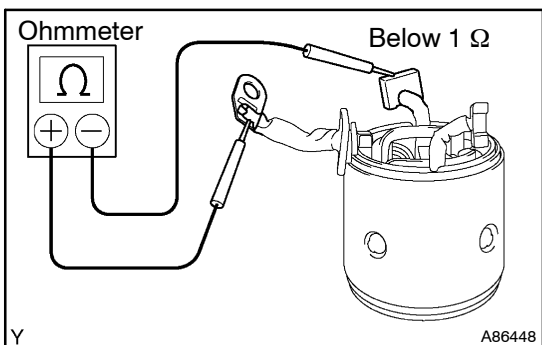


- (e) Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.

Standard undercut depth: 0.6 mm (0.024 in.)

Minimum undercut depth: 0.2 mm (0.008 in.)

If the undercut depth is less than minimum, increase the depth using a hacksaw blade.



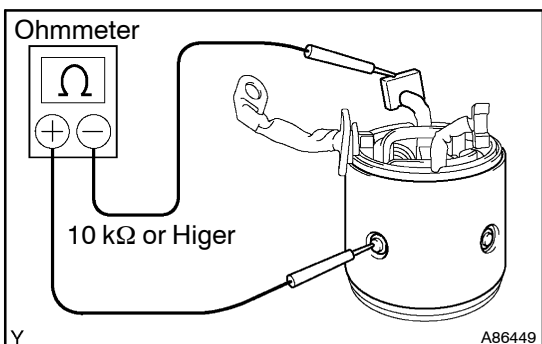
8. INSPECT STARTER YOKE ASSY

- (a) Inspect the resistance of the field coil.

- (1) Using an ohmmeter, measure the resistance between the lead wire and field coil brush lead.

Standard: Below 1 Ω

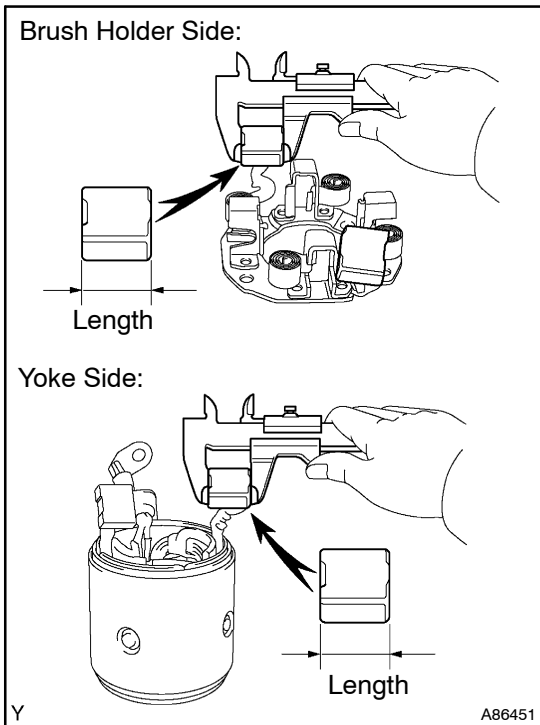
If the resistance is not as specified, replace the starter yoke.



- (2) Using an ohmmeter, measure the resistance between the field coil end and field frame.

Standard: 10 k Ω or higer

If the resistance is not as specified, repair or replace the starter yoke.



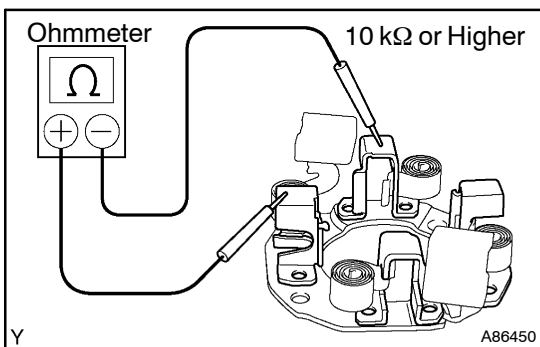
9. INSPECT BRUSH

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

Standard length: 15.5 mm (0.610 in.)

Minimum length: 10.0 mm (0.394 in.)

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



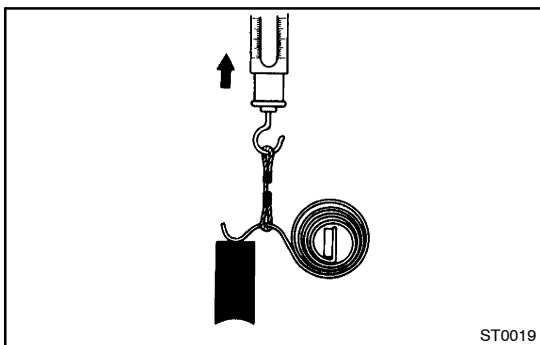
10. INSPECT STARTER BRUSH HOLDER ASSY

- (a) Inspect the resistance.

- (1) Using an ohmmeter, measure the resistance between the positive (+) and negative (-) brush holders.

Standard: 10 kΩ or higher

If the resistance is not as specified, repair or replace the brush holder.



- (b) Inspect the load of the brush spring.

- (1) Take the pull scale reading immediately after the brush spring separates from the brush.

Standard spring installed load:

23.5 to 29.5 N (2.4 to 3.0 kgf, 5.3 to 6.6 lbf)

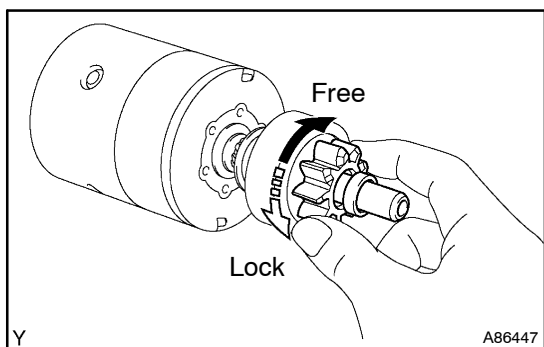
If the installed load is less than minimum replace the brush springs.

11. INSPECT STARTER CENTER BEARING CLUTCH SUB-ASSY

- (a) Check the gear teeth of the planetary gear and starter center bearing clutch for wear or damage.

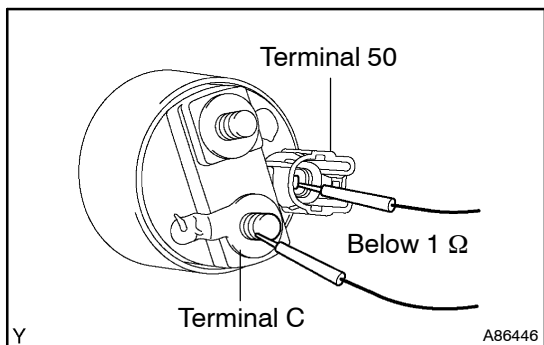
If any of the planetary gear is damaged, replace the planetary gear assembly.

If any of the gears of the starter center bearing clutch is damaged, replace the clutch.



- (b) Check the movement of the clutch pinion gear.
- (1) Rotate the clutch pinion gear clockwise, then check that it turns freely.
 - (2) Try to rotate the clutch pinion gear counterclockwise, then check that it locks.

If necessary, replace the center bearing clutch sub-assembly.

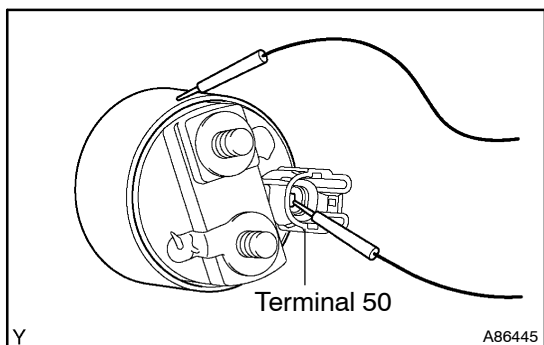


12. INSPECT STARTER MAGNETIC SWITCH ASSY

- (a) Inspect the resistance of the pull-in coil.
- (1) Using an ohmmeter, measure the resistance between terminals 50 and C.

Standard: Below 1 Ω

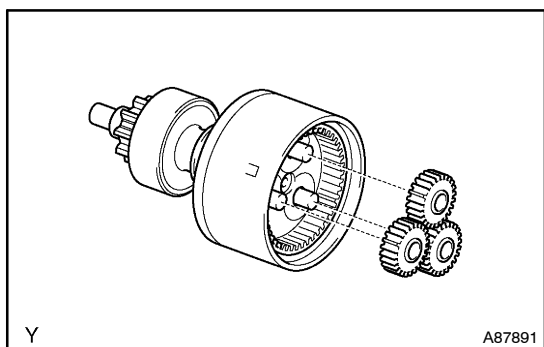
If the resistance is not as specified, replace the starter magnetic switch.



- (b) Inspect the resistance of the hold-in coil.
- (1) Using an ohmmeter, measure the resistance between terminal 50 and the switch body.

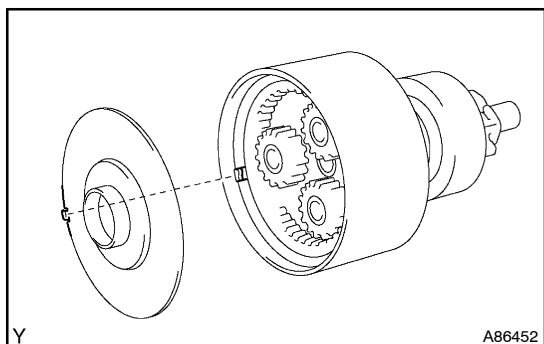
Standard: Below 1.5 Ω

If the resistance is not as specified, replace the starter magnetic switch.



13. INSTALL PLANETARY GEAR

- (a) Apply grease to the planetary gears of the planetary shaft.
- (b) Install the 3 planetary gears.

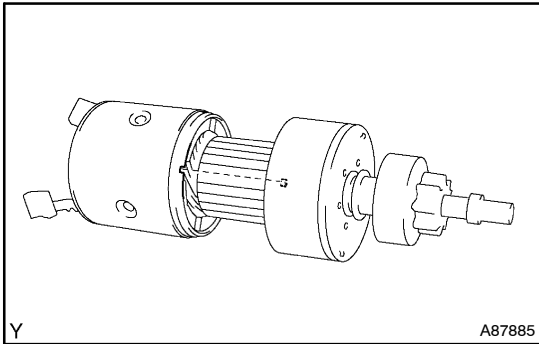


14. INSTALL STARTER ARMATURE PLATE

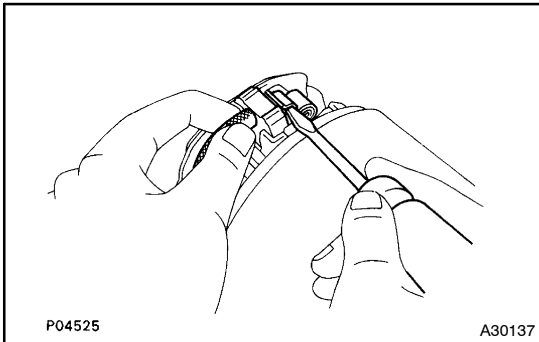
- (a) Insert the starter armature plate to the starter center bearing clutch.
- (b) Check that the keyway of the starter armature plate fits into the key of the starter center bearing clutch.

15. INSTALL STARTER ARMATURE ASSY

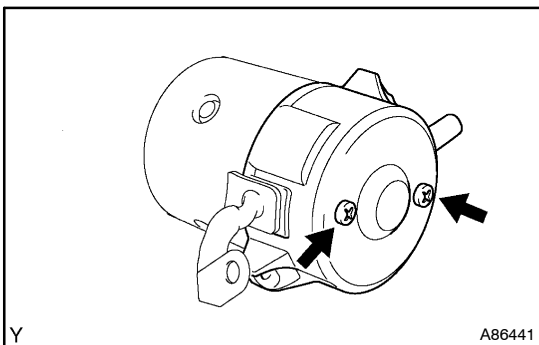
- (a) Install the starter armature to the starter center bearing clutch.



- (b) Align the protrusion of the starter center bearing clutch with the cutout of the starter yoke, then install the starter center bearing clutch to the starter yoke.
- (c) Install the brush holder.



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



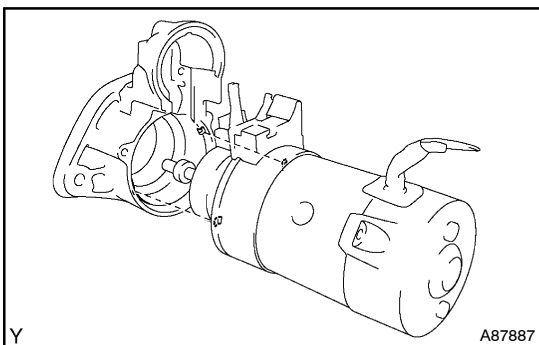
16. INSTALL STARTER COMMUTATOR END FRAME ASSY

- (a) Install the starter commutator end frame with the 2 screws.

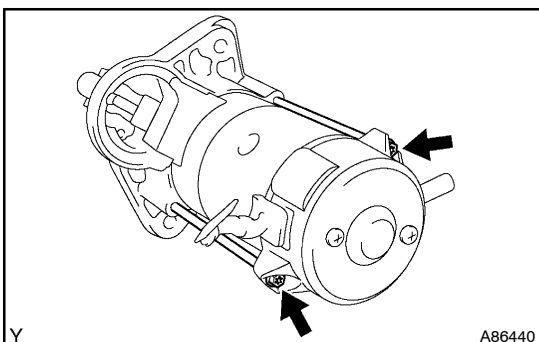
Torque: 3.8 N·m (39 kgf·cm, 33 in.·lbf)

17. INSTALL STARTER DRIVE HOUSING ASSY

- (a) Install the starter pinion drive lever to the starter center bearing clutch.
- (b) Install the rubber seal to the starter pinion drive lever.



- (c) Align the 2 protrusions of the starter center bearing clutch with the 2 cutouts of the starter drive housing, then install the starter center bearing clutch to the starter drive housing.

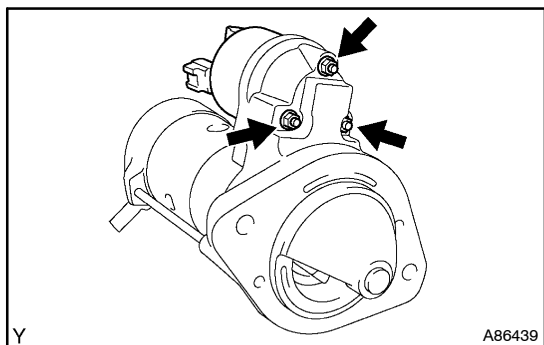


- (d) Using a Torx wrench, install the starter drive housing with the 2 bolts.

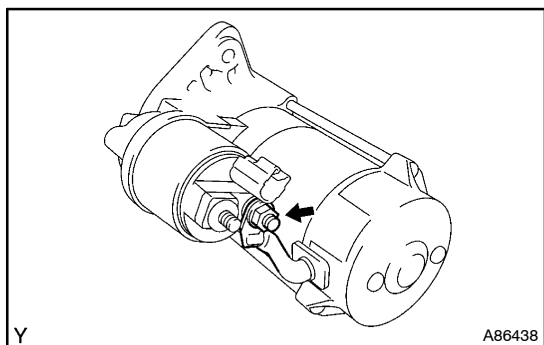
Torque: 6.0 N·m (61 kgf·cm, 53 in.·lbf)

18. INSTALL STARTER MAGNETIC SWITCH ASSY

- (a) Hook the plunger hook on the upper side of the starter pinion drive lever.
- (b) Install the spring to the starter magnetic switch.



- (c) Install the starter magnetic switch the 3 nuts.
Torque: 2.3 N·m (23 kgf·cm, 20 in·lbf)



- (d) Connect the lead wire to the terminal with the nut.
Torque: 5.9 N·m (60 kgf·cm, 52 in·lbf)