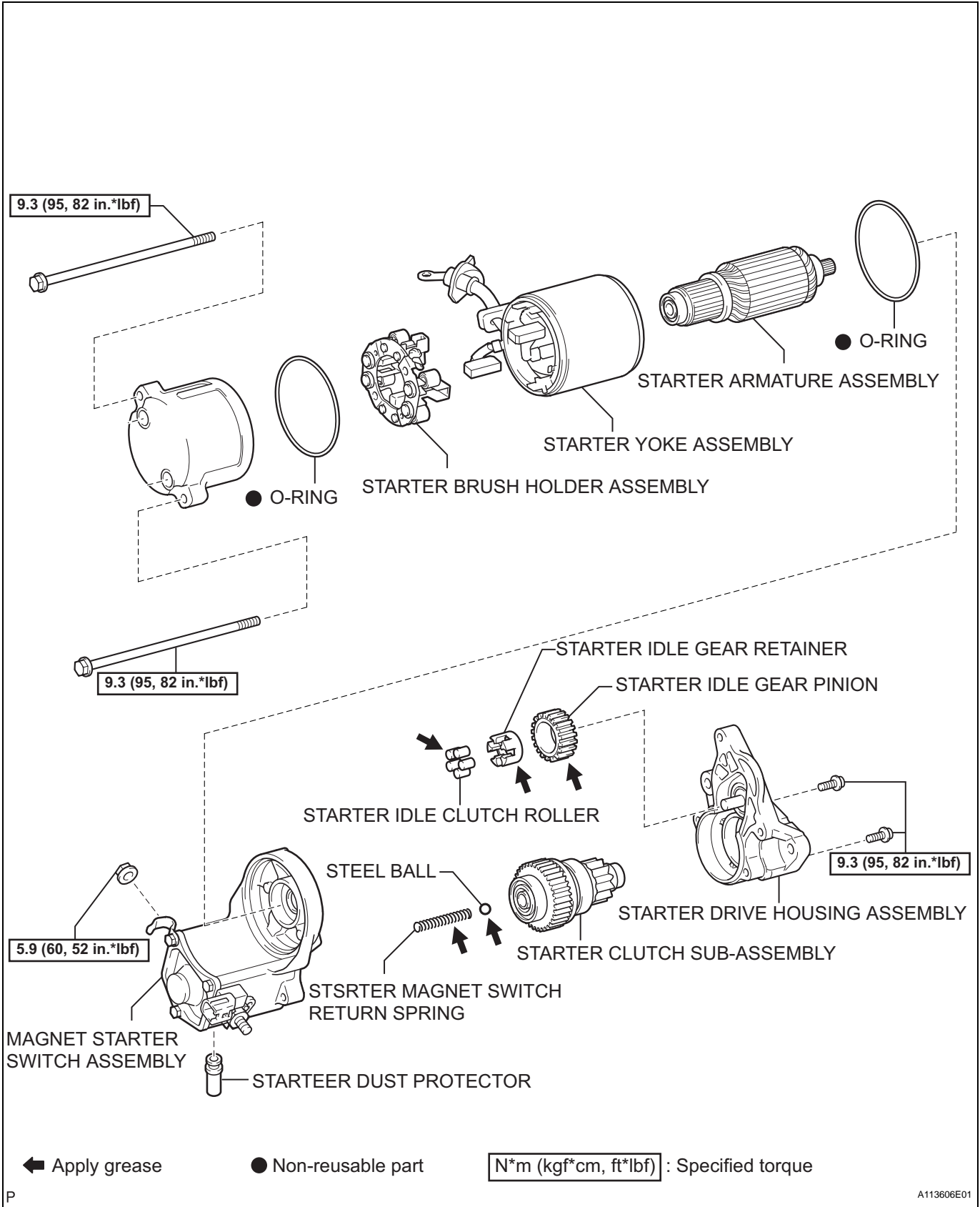


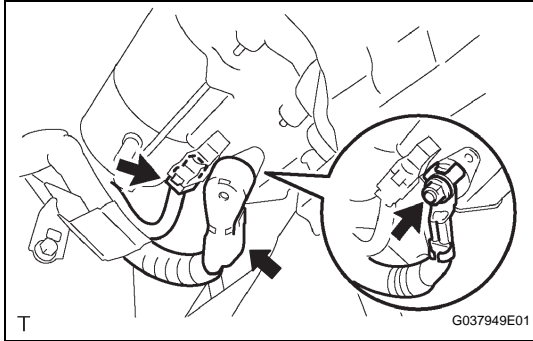
STARTER COMPONENTS



ST

REMOVAL

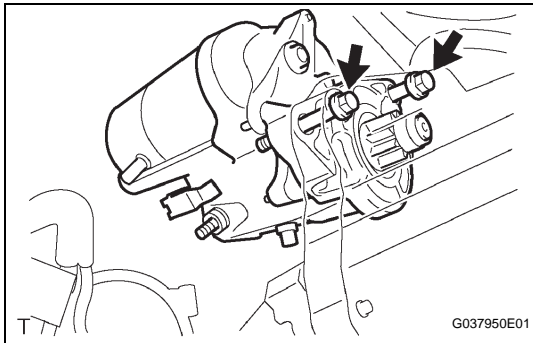
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL



2. REMOVE STARTER ASSEMBLY

- Remove the terminal cap.
- Remove the nut, then remove the starter wire harness.
- Disconnect the starter connector.

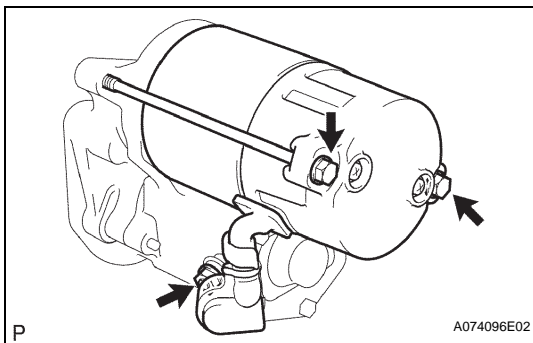
- Remove the 2 bolts, then remove the starter.



DISASSEMBLY

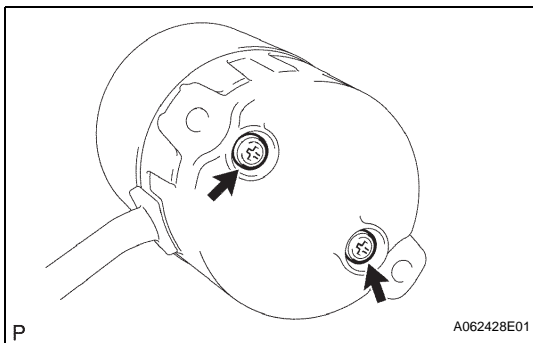
1. REMOVE STARTER YOKE ASSEMBLY

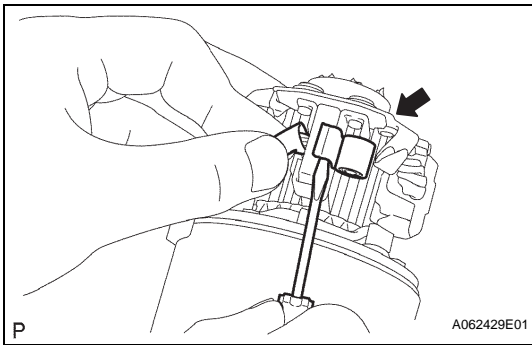
- Remove the nut, then disconnect the lead wire from terminal C.
- Remove the 2 through bolts, then pull the starter yoke and starter commutator end frame out together.
- Remove the O-ring from the starter yoke.



2. REMOVE STARTER BRUSH HOLDER ASSEMBLY

- Remove the 2 screws, then remove the end cover from the starter yoke.
- Remove the O-ring from the starter yoke.



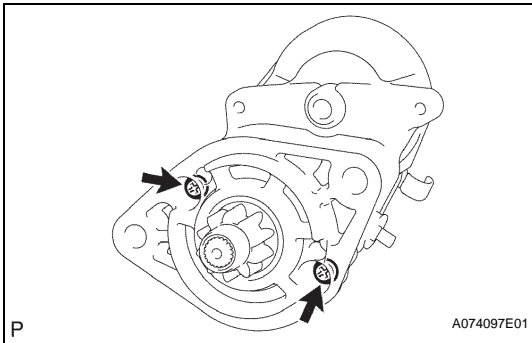


- (c) Using a screwdriver, hold the spring back and disconnect the 4 brushes from the brush holder.
- (d) Remove the brush holder from the starter yoke.

3. REMOVE STARTER ARMATURE ASSEMBLY

NOTICE:

Turn the armature and check that it turns freely.

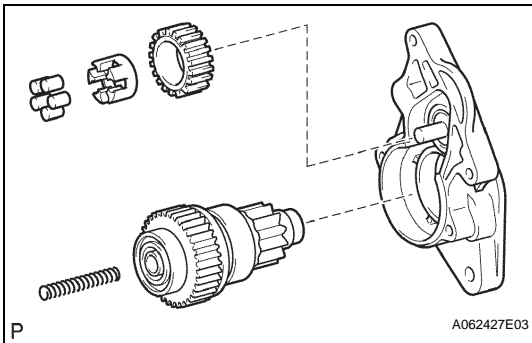


4. REMOVE STARTER CLUTCH SUB-ASSEMBLY

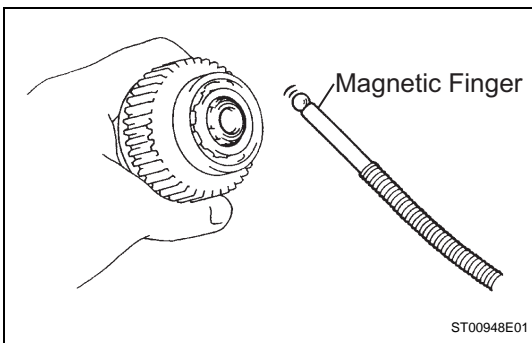
- (a) Remove the 2 screws, then remove the starter drive housing.

NOTICE:

Do not drop the starter idle gear pinion, starter idle gear retainer or starter idle gear clutch roller.



- (b) Remove the starter idle gear pinion from the starter drive housing.
- (c) Remove the starter idle gear retainer from the starter drive housing.
- (d) Remove the starter idle gear clutch roller from the starter drive housing.
- (e) Remove the starter clutch from the starter drive housing.
- (f) Remove the starter magnet switch return spring from the starter drive housing.



- (g) Using a magnetic finger, remove the steel ball from the clutch shaft hole.

INSPECTION

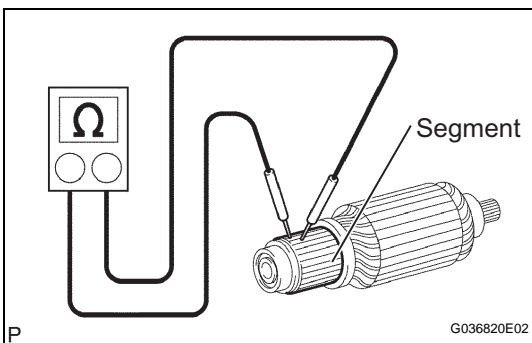
1. INSPECT STARTER ARMATURE ASSEMBLY

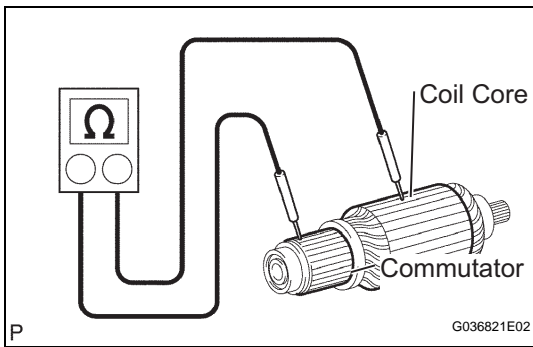
- (a) Check the resistance.
 - (1) Using an ohmmeter, check the resistance between the segments of the commutator.

Standard:

1Ω or lower

If the result is not as specified, replace the starter armature.





- (b) Check the resistance.
 (1) Using an ohmmeter, check the resistance between the commutator and armature coil core.

Standard:**10 k Ω or higher**

If the result is not as specified, replace the starter armature.

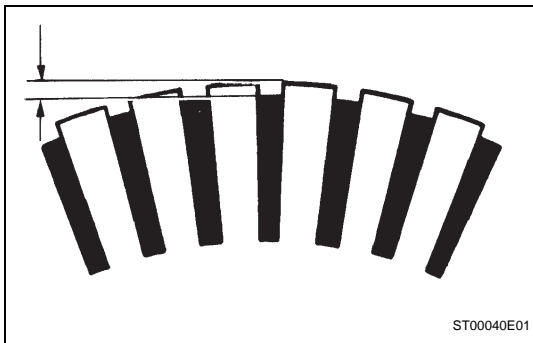
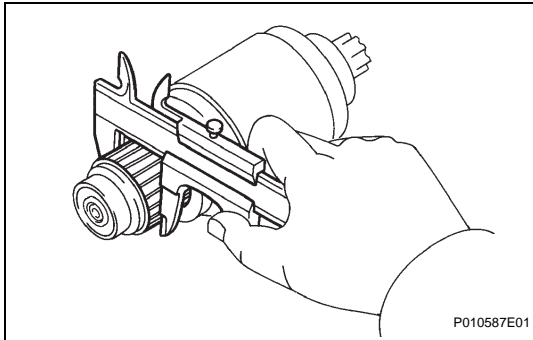
- (c) Check the commutator surface for dirt and burn. If the surface is dirty or burnt, smooth the surface with 400- grit sandpaper or a lathe.

- (d) Check the commutator diameter.

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

Standard diameter:**35.0 mm (1.378in.)****Minimum diameter:****34.0 mm (1.339in.)**

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

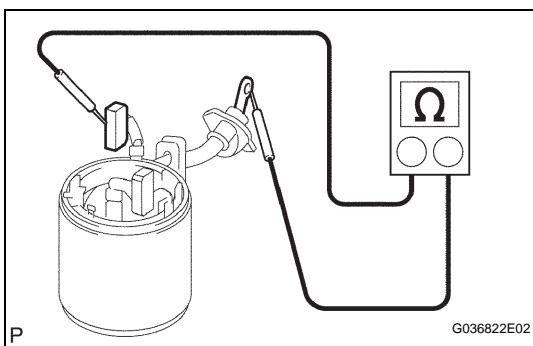


- (e) Check the undercut depth.

- (1) Check that the undercut portion between the segments is free of foreign objects and measure its depth.

Standard undercut depth:**0.7 mm (0.028in.)****Minimum undercut depth:****0.2 mm (0.008in.)**

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

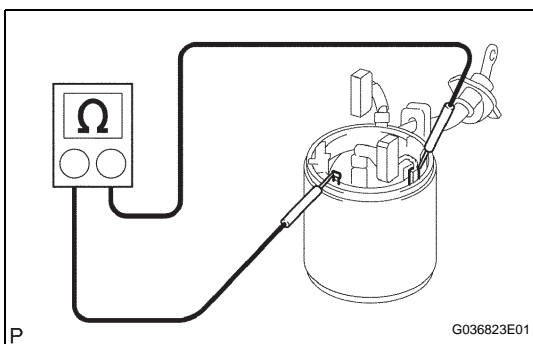
**2. INSPECT STARTER YOKE ASSEMBLY**

- (a) Check the resistance.

- (1) Using an ohmmeter, check the resistance between the lead wire and brushes.

Standard:**1 Ω or lower**

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

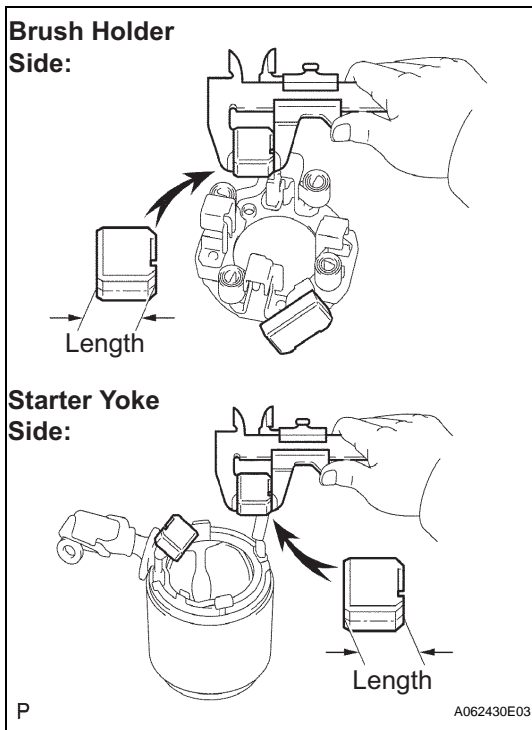


- (b) Check the resistance.

- (1) Using an ohmmeter, check the resistance between shunt coil terminals (A) and (B).

Standard:**1.5 to 1.9 Ω at 20°C(68°F)**

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



3. INSPECT BRUSH

(a) Check the brush length.

- (1) Using vernier calipers, measure the brush length

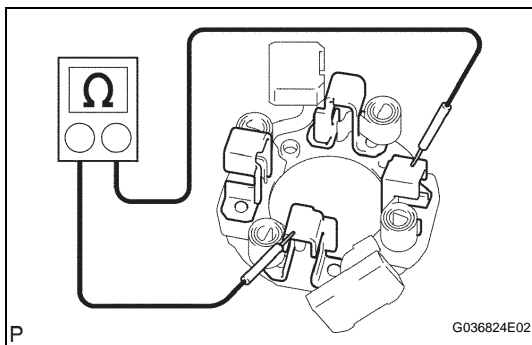
Standard length:

15.0 mm (0.591in.)

Minimum length:

9.0 mm (0.354in.)

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



4. INSPECT STARTER BRUSH HOLDER ASSEMBLY

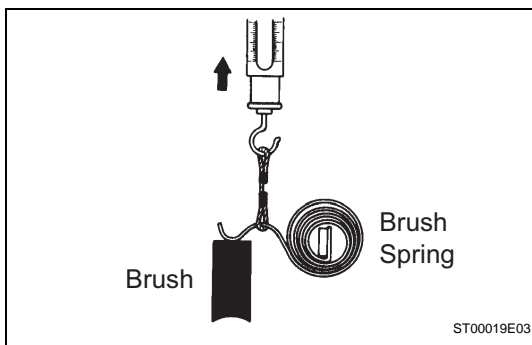
(a) Check the resistance.

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

Standard:

10 k Ω or higher

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



(b) Check the brush spring load.

- (1) Check the pull scale reading as soon as the brush spring is separated from the brush.

Standard spring load:

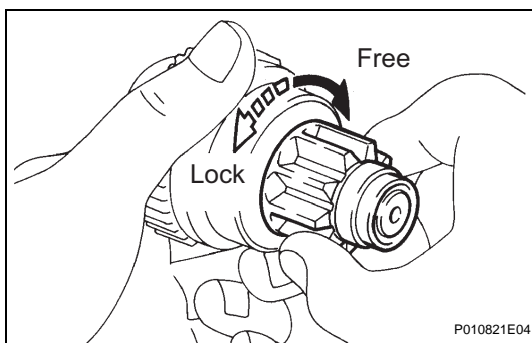
21.5 to 27.5 N (2.2 to 2.8kgf, 4.8 to 6.2lbf)

Minimum spring load:

12.7N(1.3kgf, 2.9lbf)

If the spring load is less than the minimum, replace the brush holder assy.

ST

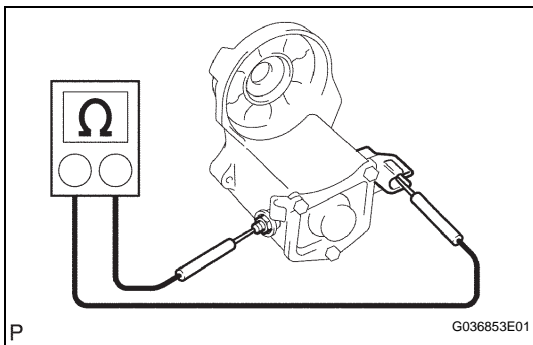


5. INSPECT STARTER CLUTCH SUB-ASSEMBLY

(a) Check the operation.

- (1) Turn the clutch pinion gear clockwise and check that it turns freely. Try to rotate the clutch pinion gear counterclockwise and check that it locks.

If necessary, replace the starter clutch.



6. INSPECT MAGNET STARTER SWITCH ASSEMBLY

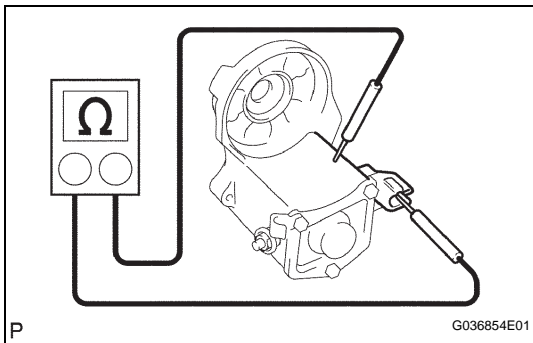
(a) Check the resistance.

- (1) Using an ohmmeter, measure the resistance between terminals 50 and C.

Standard:

1Ω or lower

If the result is not as specified, replace the magnet switch



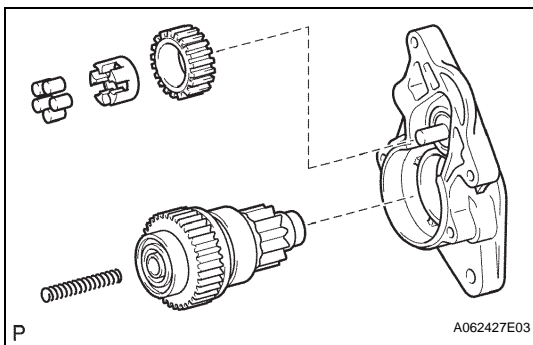
(b) Check the resistance.

- (1) Using an ohmmeter, measure the resistance between terminal 50 and the switch body.

Standard:

2.0Ω or lower

If the result is not as specified, replace the magnet switch.



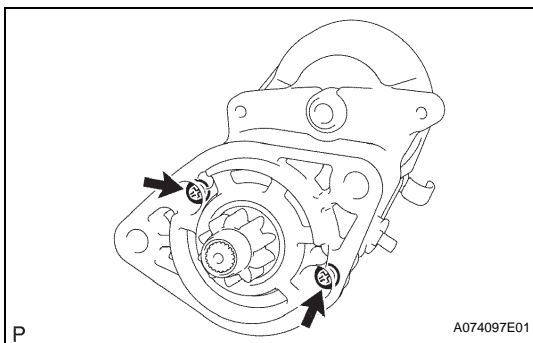
REASSEMBLY

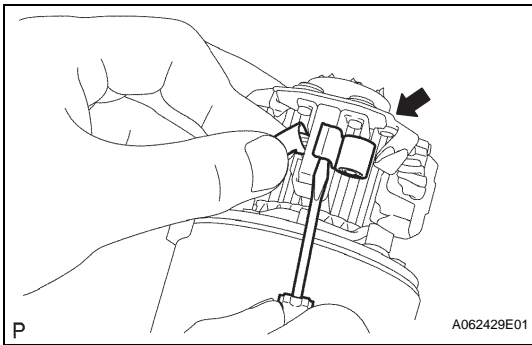
1. INSTALL STARTER CLUTCH SUB-ASSEMBLY

- Apply grease to the steel ball and install it onto the starter drive housing.
- Apply grease to the magnet switch return spring and install it onto the starter drive housing.
- Apply grease to the starter clutch, and install it onto the starter drive housing.
- Apply grease to the starter idle gear clutch roller and install it onto the starter idle gear retainer.
- Apply grease to the starter idle gear retainer and install it onto the starter idle gear pinion.
- Apply grease to the starter idle gear pinion and install it onto the starter drive housing.
- Install the starter drive housing with the 2 screws.
Torque: 9.3 N*m (95 kgf*cm, 82 in.*lbf)

2. INSTALL STARTER ARMATURE ASSEMBLY

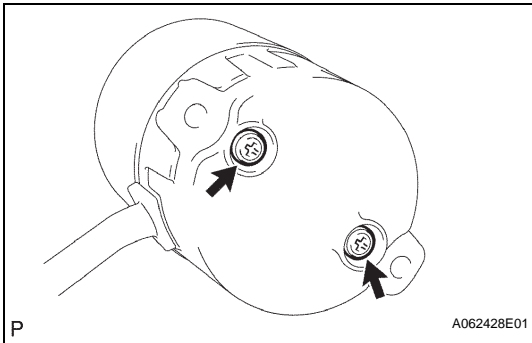
- Apply grease to the bearings and install it onto the starter yoke.



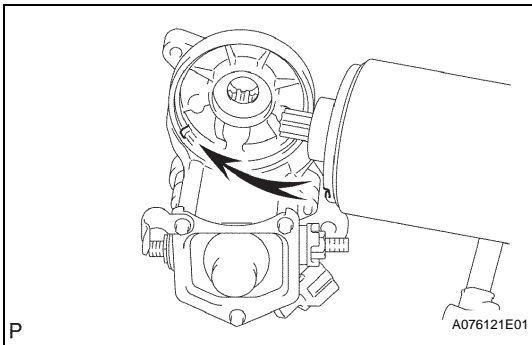


3. INSTALL STARTER BRUSH HOLDER ASSEMBLY

- (a) Place the brush holder assy on the starter yoke.
- (b) Using a screwdriver, install the 4 brushes.
- (c) Install a new O-ring onto the groove of the field frame.

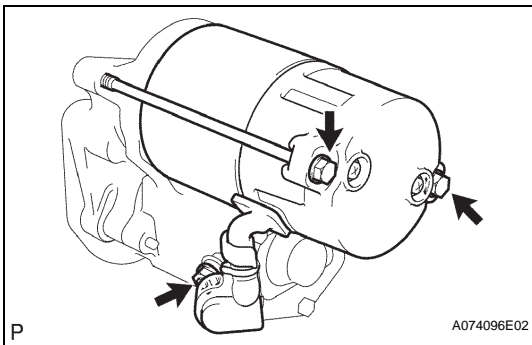


- (d) Install the end frame with the 2 screws.



4. INSTALL STARTER YOKE ASSEMBLY

- (a) Install a new O-ring onto the groove of the starter yoke.
- (b) Align the key of the starter yoke with the groove of the magnet starter switch.

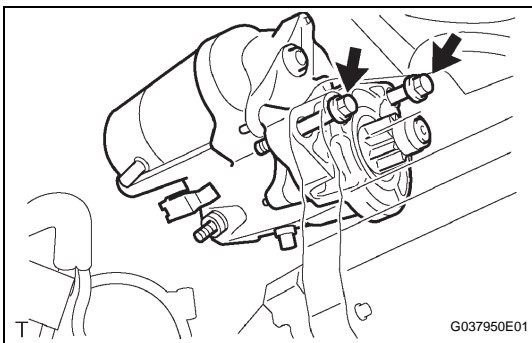


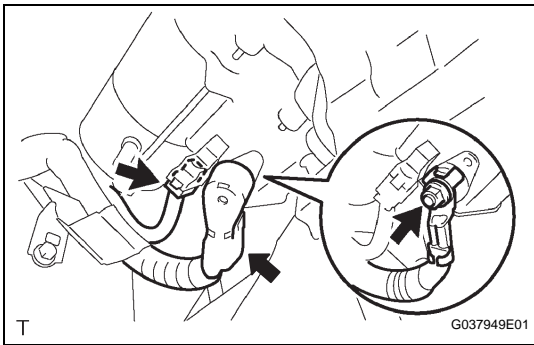
- (c) Tighten the 2 through bolts.
Torque: 9.3 N*m (95 kgf*cm, 82 in.*lbf)
- (d) Connect the lead wire to terminal C with the nut.
Torque: 5.9 N*m (60 kgf*cm, 52 in.*lbf)

INSTALLATION

1. INSTALL STARTER ASSEMBLY

- (a) Install the starter with the 2 bolts.
Torque: 37 N*m (377 kgf*cm, 27 ft.*lbf)





- (b) Connect the starter connector.
- (c) Install the starter wire harness with the nut.
Torque: 9.8 N*m (100 kgf*cm, 7 ft.*lbf)
- (d) Install the terminal cap.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)