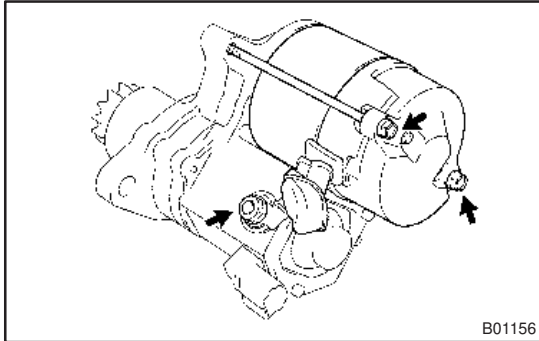


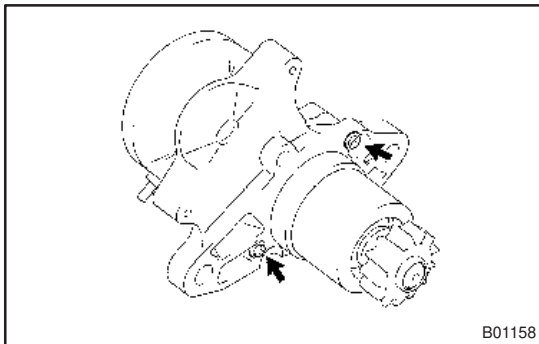
# STARTER ASSY(1.2KW) (1AZ-FE) OVERHAUL

1906K-01



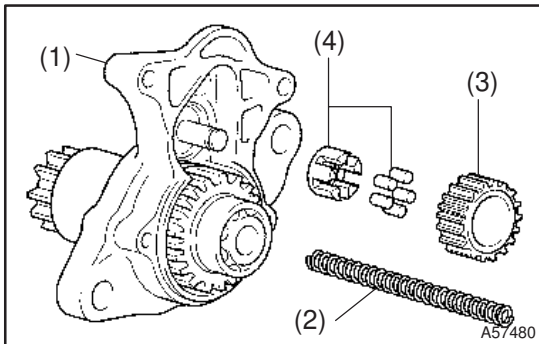
## 1. REMOVE STARTER YOKE ASSY

- (a) Remove the starter cover.
- (b) Remove the nut, and disconnect the lead wire from the C terminal.
- (c) Remove the 2 through bolts. Pull out the field frame together with the armature.
- (d) Remove the O-ring from the field frame.

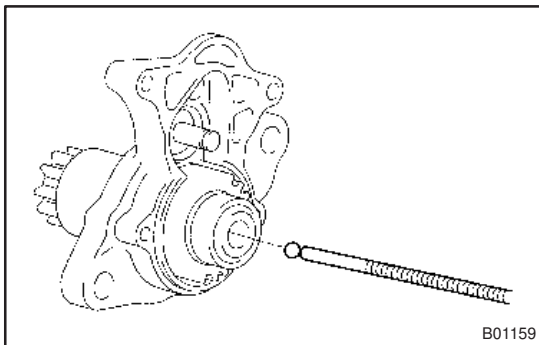


## 2. REMOVE STARTER CLUTCH SUB-ASSY

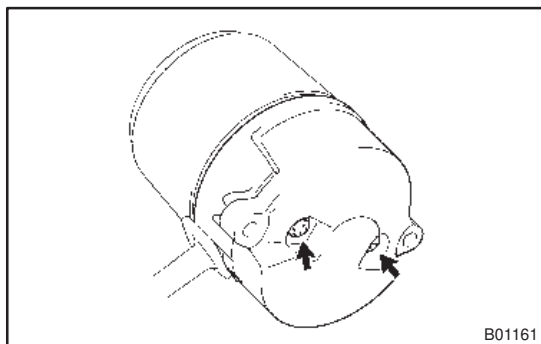
- (a) Remove the 2 screws.



- (b) Remove the starter housing and clutch assembly (1), return spring (2), idler gear (3) and bearing from the magnetic switch.

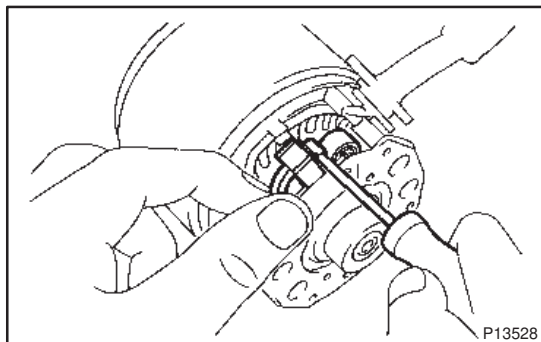


- (c) Using a magnetic finger, remove the steel ball from the clutch shaft hole.



### 3. REMOVE STARTER BRUSH HOLDER ASSY

- (a) Remove the 2 screws and end cover from the field frame.
- (b) Remove the O-ring from the field frame.

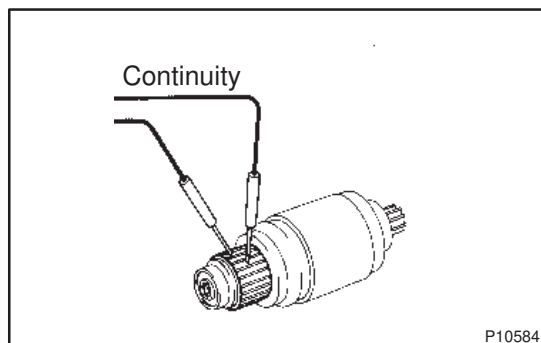


- (c) Using a screwdriver, hold the spring back and disconnect the brush from the brush holder. Disconnect the 4 brushes, and remove the brush holder.

#### NOTICE:

**At the time of reassembly, check that the positive (+) lead wires are not grounded.**

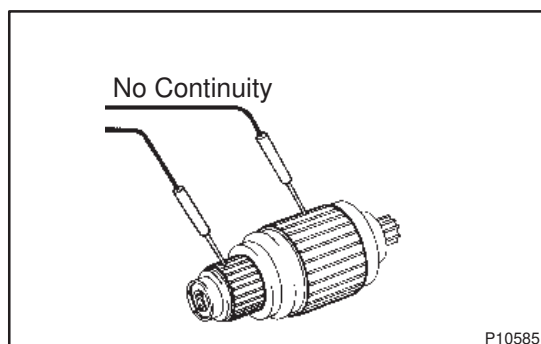
### 4. REMOVE STARTER ARMATURE ASSY



### 5. INSPECT STARTER ARMATURE ASSY

- (a) Check the commutator for open circuit.
  - (1) Using an ohmmeter, check that there is continuity between the segments of the commutator.

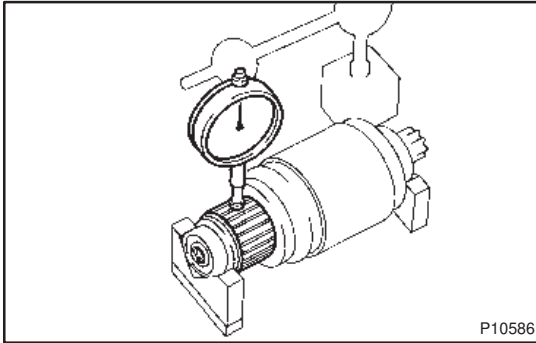
If there is no continuity between any segment, replace the armature.



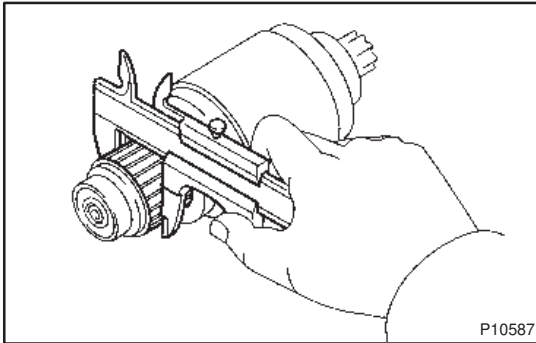
- (b) Check the commutator for ground.
  - (1) Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.

If there is continuity, replace the armature.

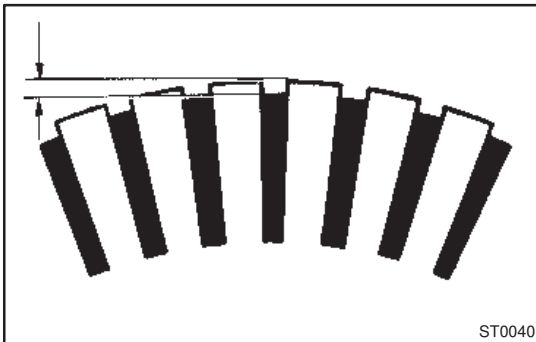
- (c) Check the commutator for the dirty and burnt surfaces. If the surface is dirty or burnt, correct it with the sandpaper (No. 400) or on a lathe.



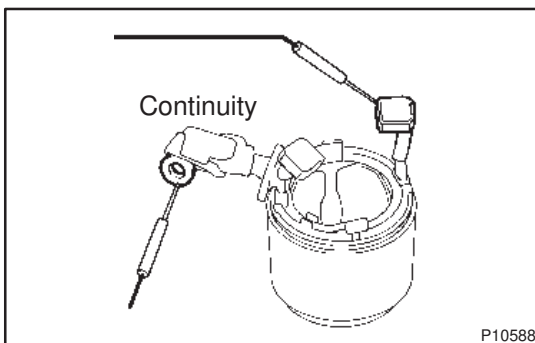
- (d) Place the commutator on V-blocks.  
 (1) Using a dial gauge, measure the circle runout.  
**Maximum circle runout: 0.05 mm (0.0020 in.)**  
 If the circle runout is greater than maximum, replace the armature.



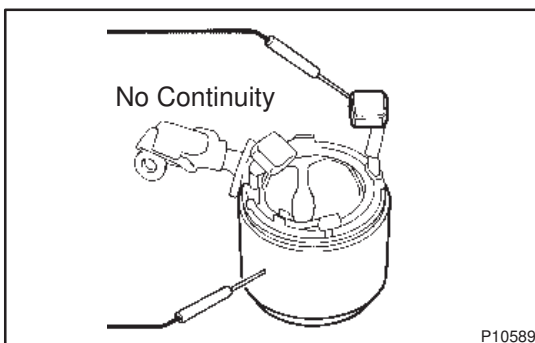
- (e) Using vernier calipers, measure the commutator diameter.  
**Standard diameter: 30.0 mm (1.181 in.)**  
**Minimum diameter: 29.0 mm (1.142 in.)**  
 If the diameter is less than minimum, replace the armature.



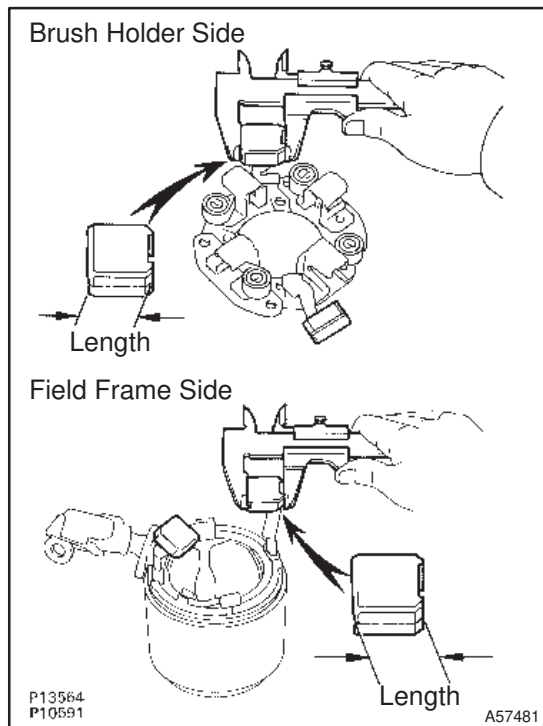
- (f) Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.  
**Standard undercut depth: 0.6 mm (0.024 in.)**  
**Minimum undercut depth: 0.2 mm (0.008 in.)**  
 If the undercut depth is less than minimum, correct it with a hacksaw blade.



- (g) Check the field coil for open circuit.  
 (1) Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.  
 If there is no continuity, replace the field frame.



- (h) Check the field coil for ground.  
 (1) Using an ohmmeter, check that there is no continuity between the field coil brush lead and field frame.  
 If there is continuity, repair or replace the field frame.



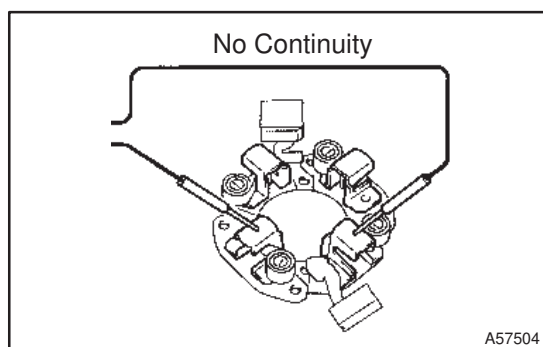
## 6. INSPECT STARTER BRUSH HOLDER ASSY

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

**Standard length: 15.5 mm (0.610 in.)**

**Minimum length: 10 mm (0.394 in.)**

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



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

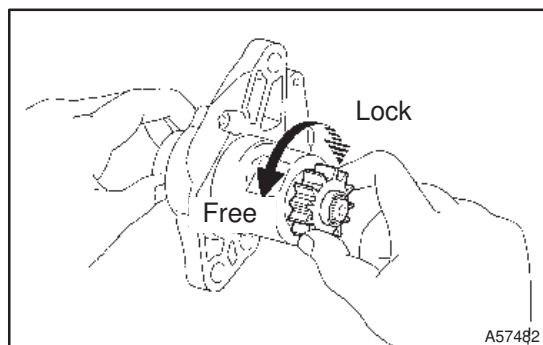
If there is continuity, repair or replace the brush holder.

## 7. INSPECT STARTER CLUTCH SUB-ASSY

- (a) Check the gear teeth on the pinion gear, idler gear and clutch assembly for wear or damage.

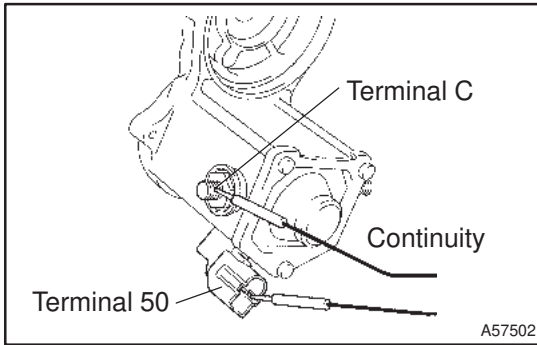
If damaged, replace the gear or clutch assembly.

If damaged, also check the ring gear of the flywheel/drive plate for wear or damage.



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

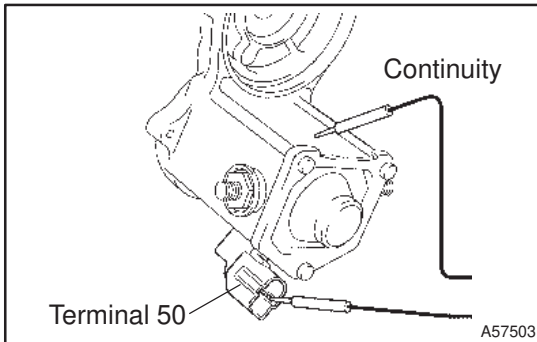
If necessary, replace the clutch assembly.



## 8. INSPECT MAGNET STARTER SWITCH ASSY

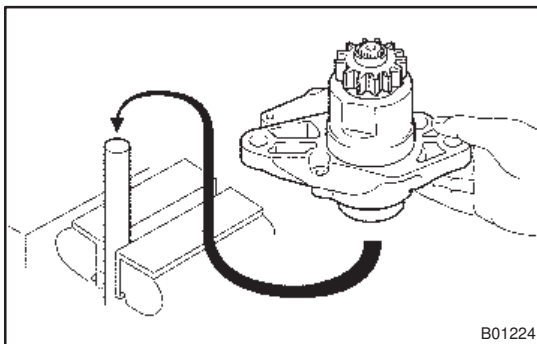
- (a) Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, check and replace the magnetic switch.



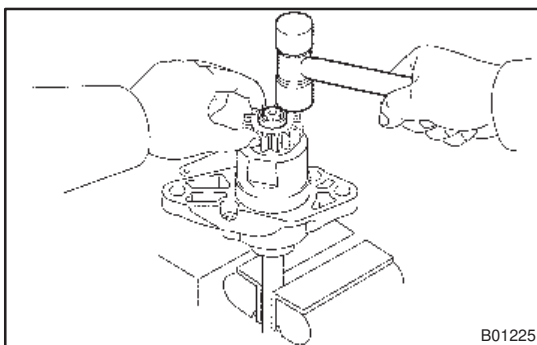
- (b) Using an ohmmeter, check that there is continuity between the terminal 50 and the switch body.

If there is no continuity, replace the magnetic switch.



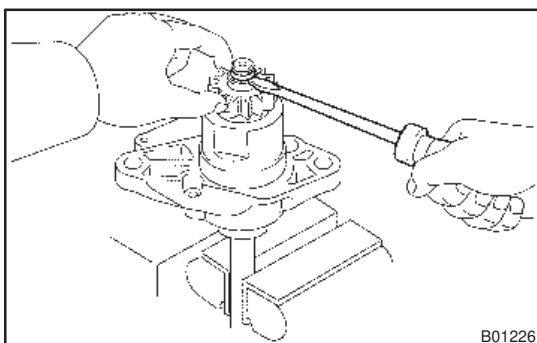
## 9. REPLACE STARTER CLUTCH SUB-ASSY

- (a) Mount a brass bar in a vise, and install the starter housing and clutch assembly to the brass bar.

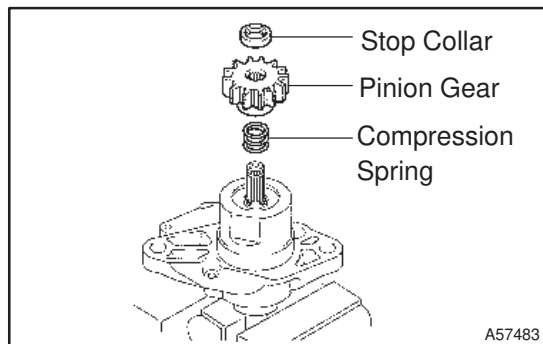


- (b) Push down the pinion gear.

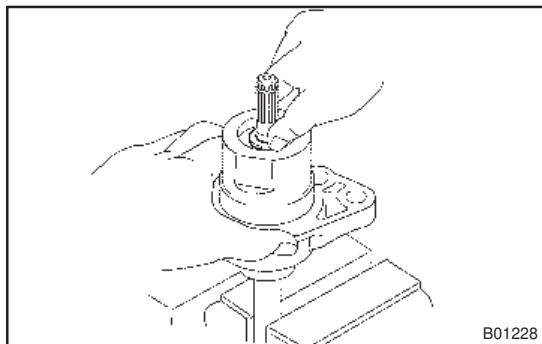
- (c) Using a plastic-faced hammer, tap down the stop collar.



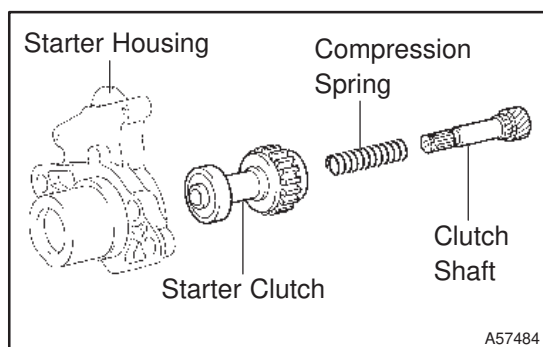
- (d) Using a screwdriver, pry out the snap ring.



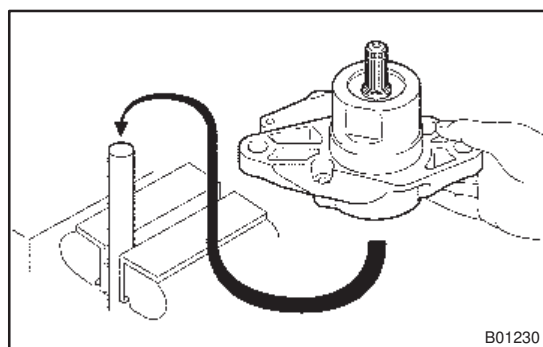
- (e) Remove the stop collar, pinion gear and compression spring.



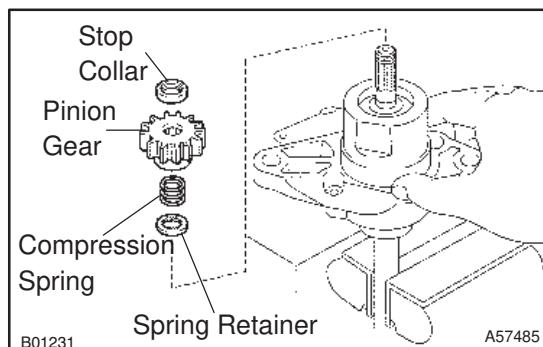
- (f) Push down the starter housing, and remove the spring retainer.  
 (g) Remove the clutch shaft, compression spring and starter clutch from the starter housing.



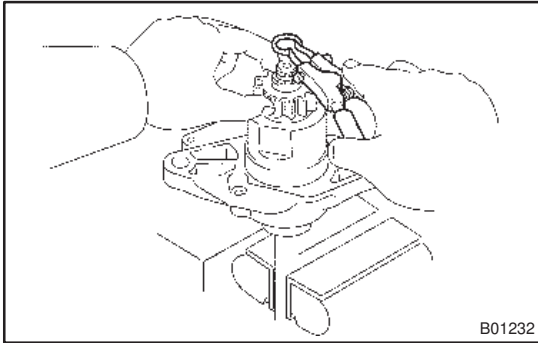
- (h) Assemble the starter housing and the clutch assembly.  
 (1) Install the starter clutch, compression spring, and clutch shaft to the starter housing.



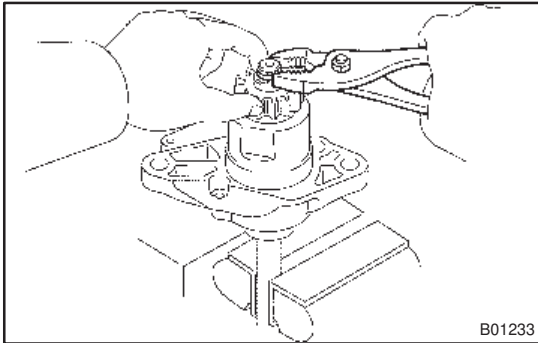
- (2) Mount a brass bar in a vise, install the starter housing and clutch assembly to the brass bar.



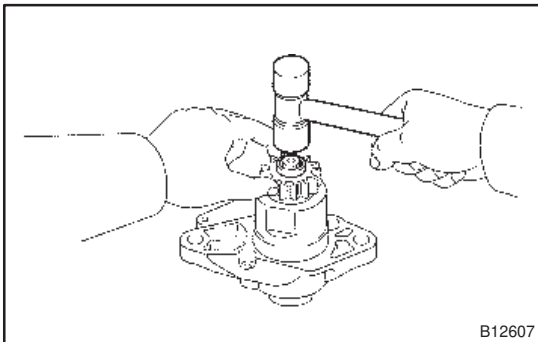
- (3) Push down the starter housing, and install the spring retainer, compression spring, pinion gear and stop collar.



- (4) Push down the pinion gear.
- (5) Using snap ring pliers, install a new snap ring.

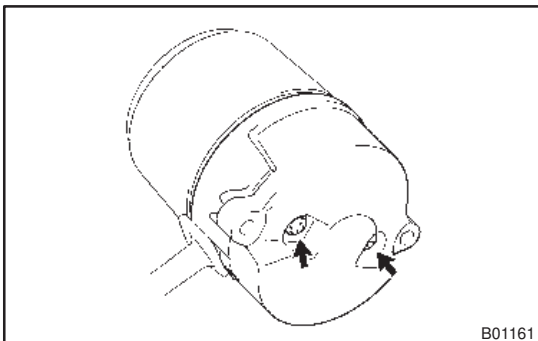


- (6) Using pliers, compress the snap ring.
- (7) Check that the snap ring fits correctly.
- (8) Remove the starter housing and clutch assembly from the brass bar.



- (i) Using a plastic-faced hammer, tap the clutch shaft and install the stop collar onto the snap ring.

## 10. INSTALL STARTER ARMATURE ASSY



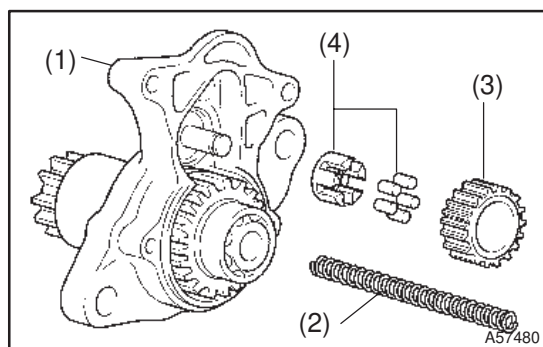
## 11. INSTALL STARTER BRUSH HOLDER ASSY

- (a) Install the brush holder.
- (b) Install an O-ring to the groove of the field frame.
- (c) Install the end frame with the 2 screws.

**Torque: 1.5 N·m (15 kgf·cm, 13 in.·lbf)**

## 12. INSTALL STARTER CLUTCH SUB-ASSY

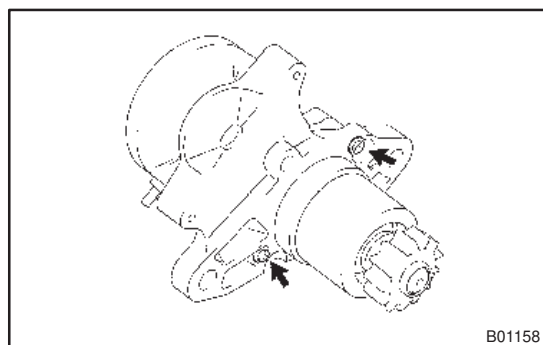
- (a) Apply grease to the steel ball, and install it to the clutch shaft hole.



- (b) Apply grease to the these parts, and install them to the starter housing.

(1)	Starter magnet switch return spring
(2)	Starter idle gear pinion
(3)	Starter idle gear retainer
(4)	Starter idle gear clutch roller

- (c) Apply grease to the clutch gear.

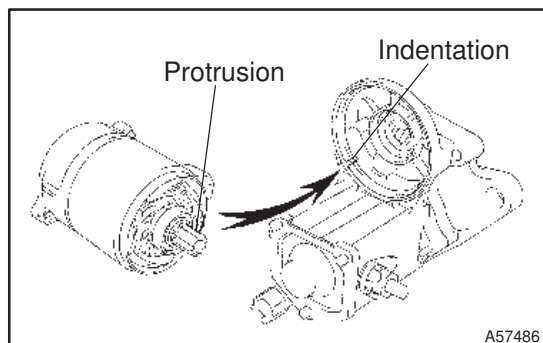


- (d) Install the starter housing and clutch assembly with the 2 screws.

**Torque: 5.9 N·m (60 kgf·cm, 52 in·lbf)**

### 13. INSTALL STARTER YOKE ASSY

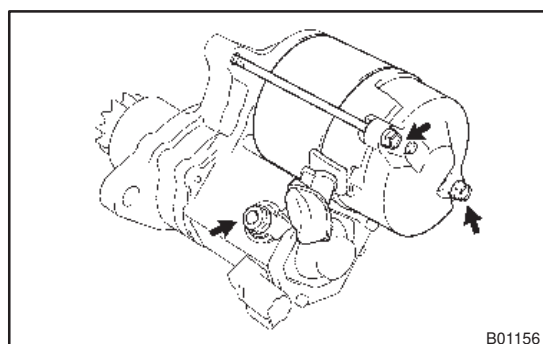
- (a) Install an O-ring to the groove of the field frame.



- (b) Pull out the field frame together with the armature.

**HINT:**

Align the protrusion of the field frame with the indentation of the magnetic switch.



- (c) Install the field frame and armature assembly with the 2 through bolts.

**Torque: 5.9 N·m (60 kgf·cm, 52 in·lbf)**

- (d) Connect the lead wire to the C terminal with the nut.

**Torque: 5.9 N·m (60 kgf·cm, 52 in·lbf)**