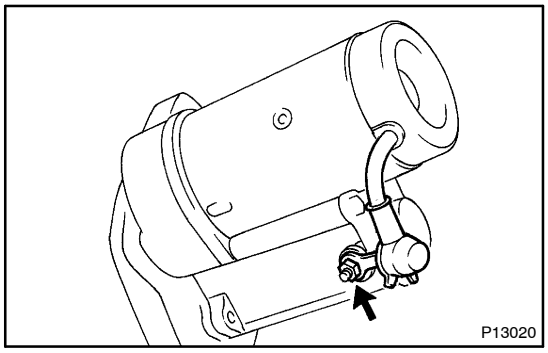
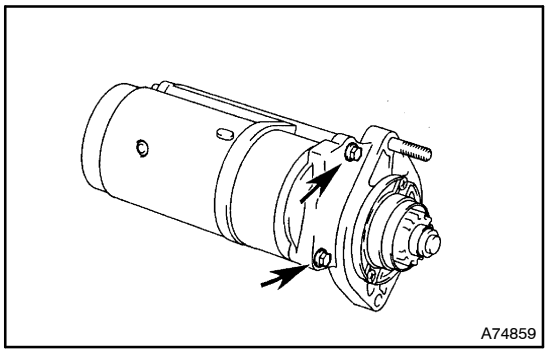
1912E–03

OVERHAUL



1. REMOVE STARTER YOKE ASSY

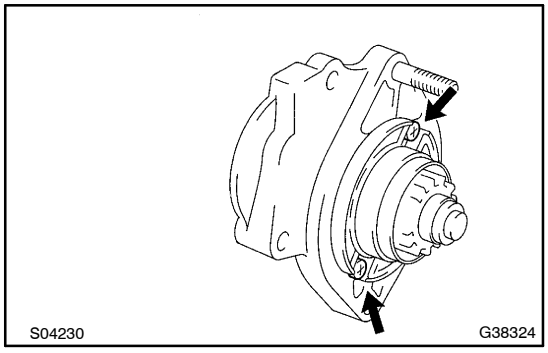
(a) Remove the nut, and disconnect the lead wire from the magnet starter switch terminal.



(b) Remove the 2 bolts.

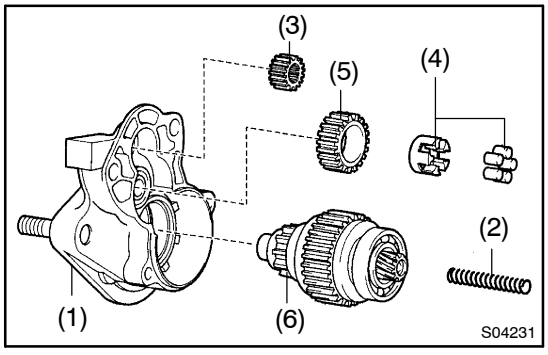
(c) Pull out the starter yoke assy with the starter armature from the magnet starter switch.

(d) Remove the O–ring from the starter yoke assy.



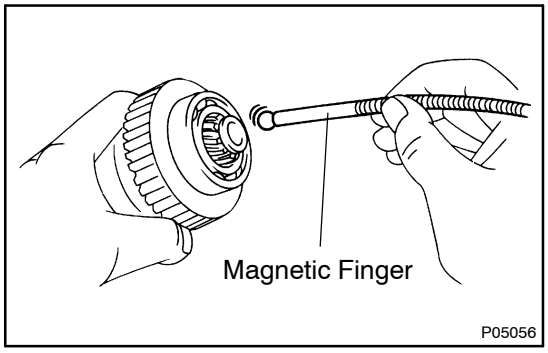
2. REMOVE MAGNET STARTER SWITCH ASSY

(a) Remove the 2 screws.

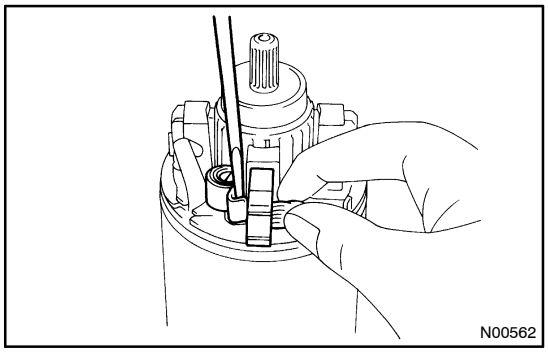


(b) Remove the following parts from the magnet starter switch assy:

(1)	Starter housing
(2)	Return spring
(3)	Pinion gear
(4)	Bearing
(5)	Idler gear
(6)	Starter clutch sub–assy

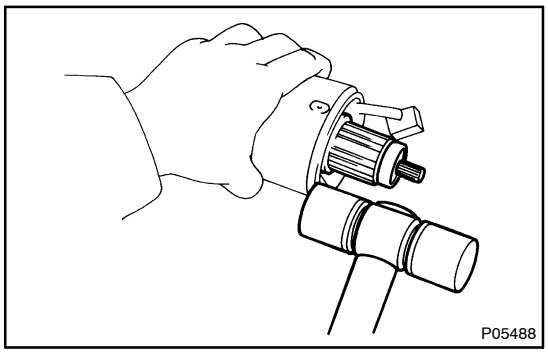


(c) Using a magnetic finger, remove the steel ball from the shaft clutch hole.



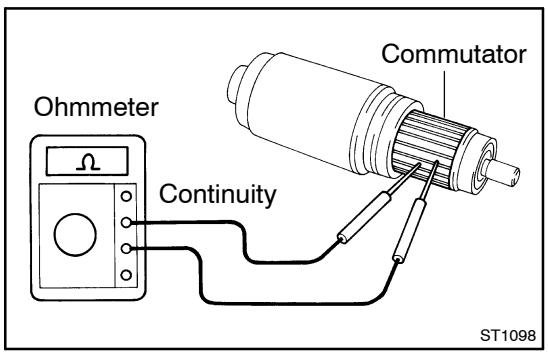
3. REMOVE STARTER BRUSH HOLDER ASSY

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



4. REMOVE STARTER ARMATURE ASSY

(a) Using a plastic hammer, tap the frame end to remove the armature assy from the starter yoke.

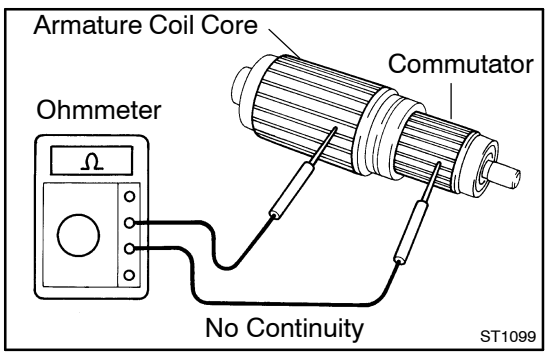


5. INSPECT STARTER ARMATURE ASSY

(a) Inspect commutator for open circuit.

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

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



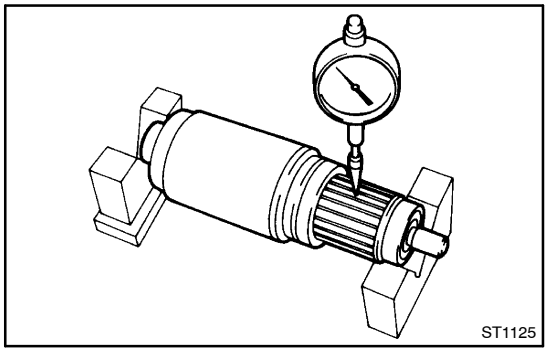
(b) Inspect commutator for ground.

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

If there is continuity, replace the starter armature assy.

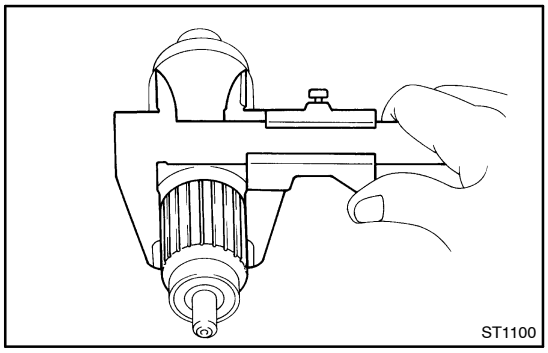
(c) Inspect commutator for dirty and burnt surfaces.

If the surface is dirty or burnt, correct it with sandpaper (No. 400) or on a lathe.



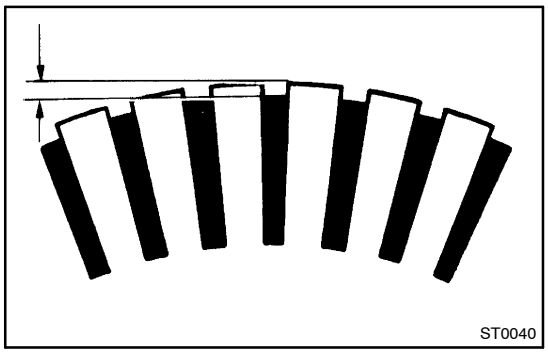
(d) Inspect commutator circle runout.
(1) Place the commutator on V–blocks.
(2) Using a dial indicator, measure the circle runout.
Maximum circle runout: 0.05 mm (0.0020 in.)

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



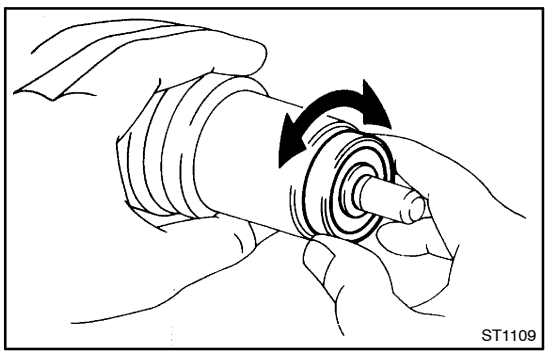
(e) Inspect commutator diameter.
(1) Using vernier calipers, measure the commutator diameter.
Standard diameter: 35.0 mm (1.378 in.)
Minimum diameter: 34.0 mm (1.339 in.)

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



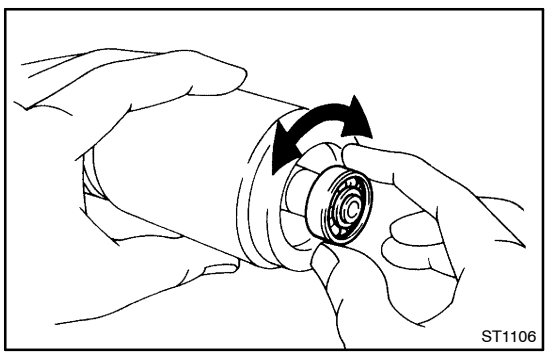
(f) Inspect undercut depth.
(1) Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.
Standard undercut depth: 0.7 mm (0.028 in.)
Minimum undercut depth: 0.2 mm (0.008 in.)

If the undercut depth is less than the minimum, replace the starter amature assy.



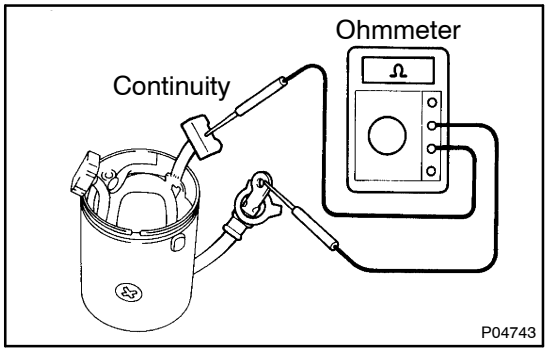
(g) Inspect front bearing.
(1) Turn the bearing by hand while applying inward force.

If resistance is felt or the bearing sticks, replace the starter armature assy.



(h) Inspect rear bearing.
(1) Turn the bearing by hand while applying inward force.

If resistance is felt or the bearing sticks, replace the starter armature assy.

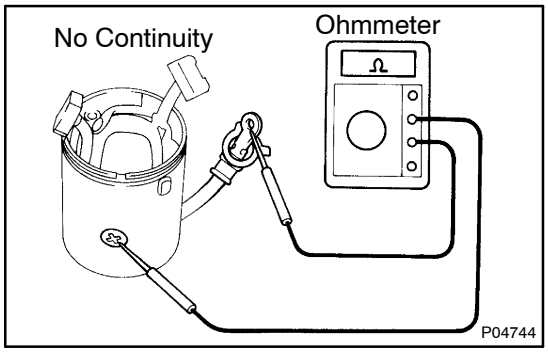


6. INSPECT STARTER YOKE ASSY

(a) Inspect field coil for open circuit.

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

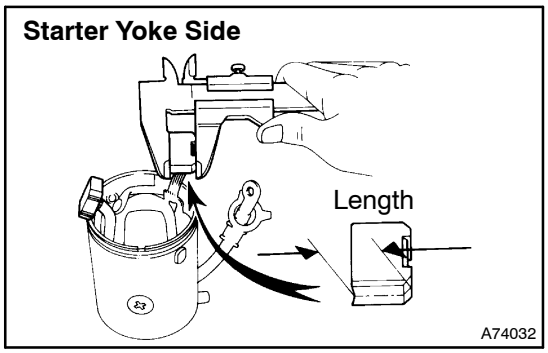
If there is no continuity, replace the starter yoke assy.



(b) Inspect field coil for ground.

(1) Using an ohmmeter, check that there is no continuity between the field coil end and field frame.

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



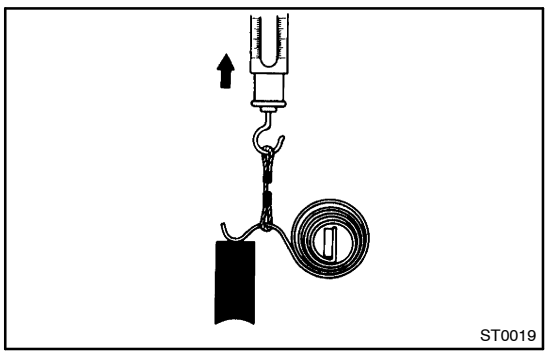
(c) Inspect brush length.

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

Standard length: 16.5 mm (0.650 in.)

Minimum length: 9.0 mm (0.354 in.)

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



7. INSPECT STARTER BRUSH HOLDER ASSY

(a) Inspect brush spring load.

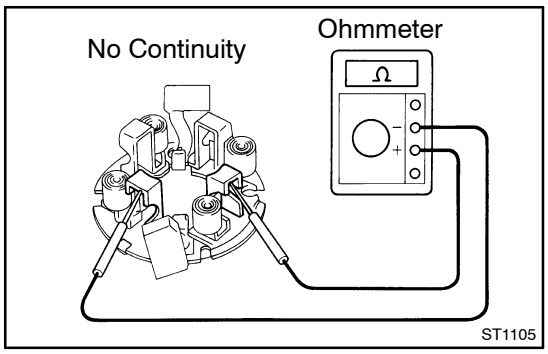
(1) Take the pull scale reading the instant the brush spring separates from the brush.

Standard spring installed load:

26.5 to 32.3 N (2.7 to 3.3 kgf, 5.9 to 7.3 lbf)

Minimum spring installed load: 17.6 N (1.8 kgf, 4.0 lbf)

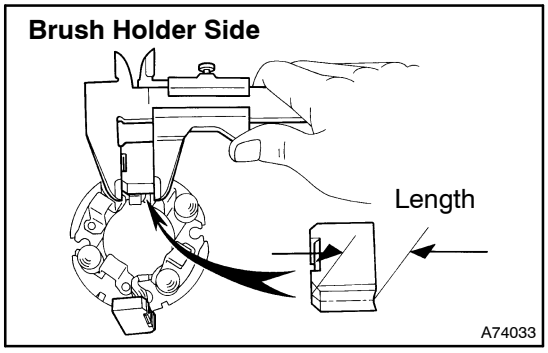
If the installed load is less than the minimum replace the starter brush holder assy.



(b) Inspect brush holder insulation.

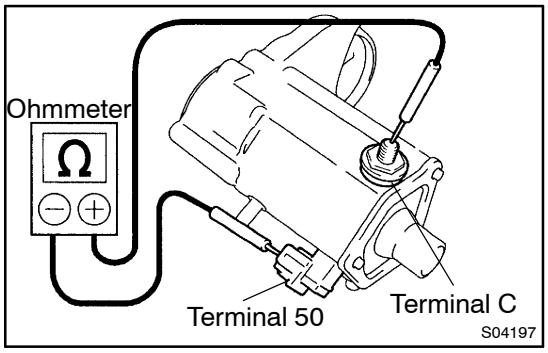
(1) Using an ohmmeter, check that there is no continuity between the positive (+) and negative (–) brush holders.

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



(c) Inspect brush length.
(1) Using vernier calipers, measure the brush length.
Standard length: 16.5 mm (0.650 in.)
Minimum length: 9.0 mm (0.354 in.)

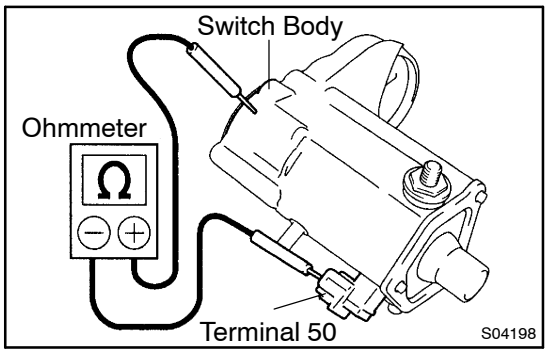
If the length is less than the minimum, replace the starter brush holder assy.



8. INSPECT MAGNET STARTER SWITCH ASSY

(a) Do pull–in coil open circuit test.
(1) Using an ohmmeter, check that there is continuity between terminals 50 and C.

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



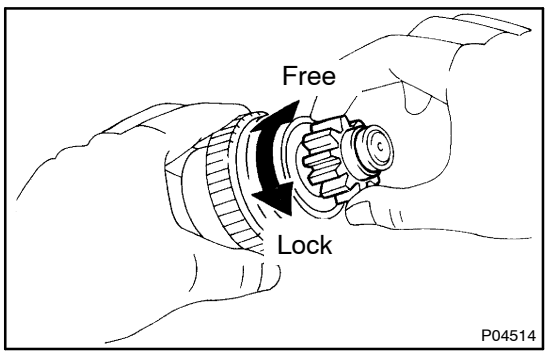
(b) Do holding coil open circuit test.
(1) Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

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

9. INSPECT STARTER CLUTCH SUB–ASSY

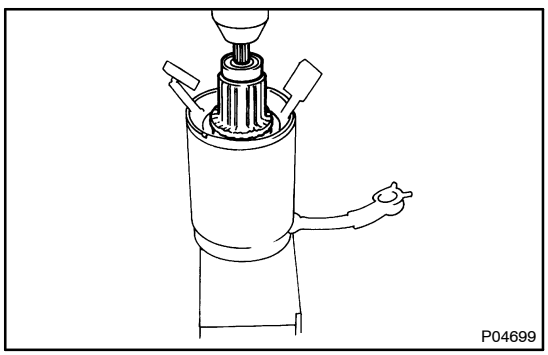
(a) Inspect gear teeth.
(1) Check the gear teeth on the pinion gear, idle gear and starter clutch sub–assy for wear or damage.

If damaged, replace the gear or starter clutch sub–assy.



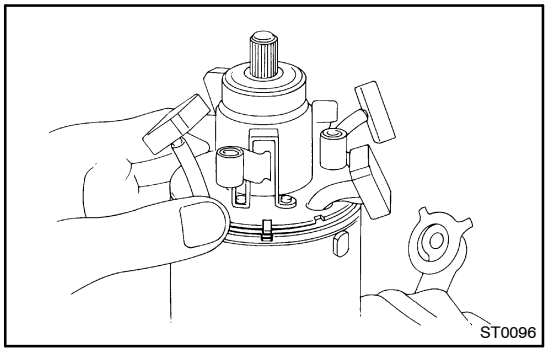
(b) Inspect starter clutch sub–assy pinion gear.
(1) Hold the starter clutch and rotate the pinion gear clockwise, and check that it turns freely. Try to rotate the pinion gear counterclockwise and check that it locks.

If necessary, replace the starter clutch sub–assy.



10. INSTALL STARTER ARMATURE ASSY

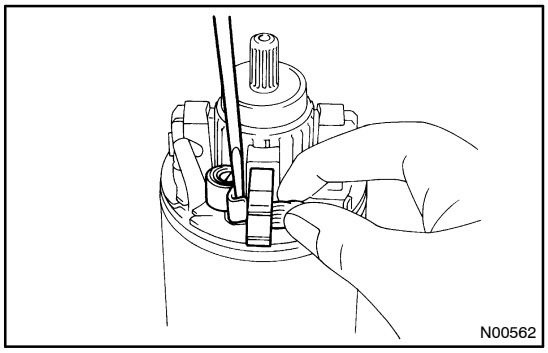
(a) Apply grease to the starter armature assy bearings.
(b) Using a press, press the starter armature assy into the starter yoke.



11. INSTALL STARTER BRUSH HOLDER ASSY

(a) Align the claw of the starter brush holder assy with the claw groove of the starter yoke.

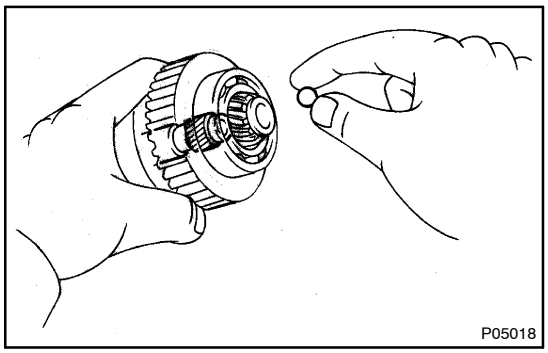
(b) Place the starter brush holder assy on the starter yoke.



(c) Using a screwdriver, hold the brush spring back, and connect the brush into the starter brush holder assy. Contact the 4 brushes.

NOTICE:

Check that the positive (+) lead wires and starter yoke side wires are not grounded.



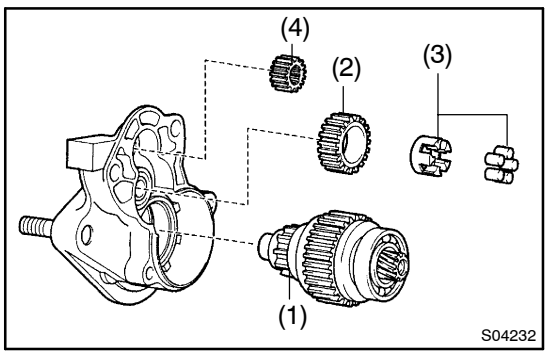
12. INSTALL MAGNET STARTER SWITCH ASSY

(a) Apply grease to the steel ball.

(b) Insert the steel ball into the starter clutch shaft hole.

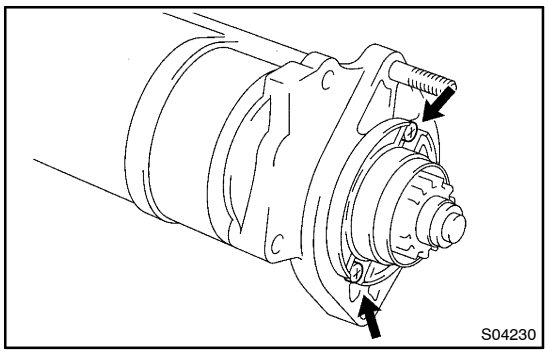
(c) Apply grease to the return spring.

(d) Insert the return spring into the magnetic starter switch assy hole.



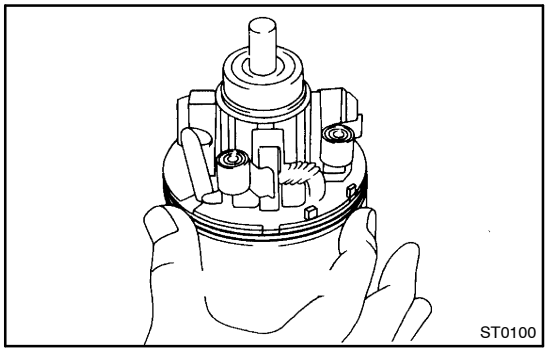
(e) Place the following parts in position on the starter housing:

(1)	Starter clutch sub–assy
(2)	Idler gear
(3)	Bearing
(4)	Pinion gear



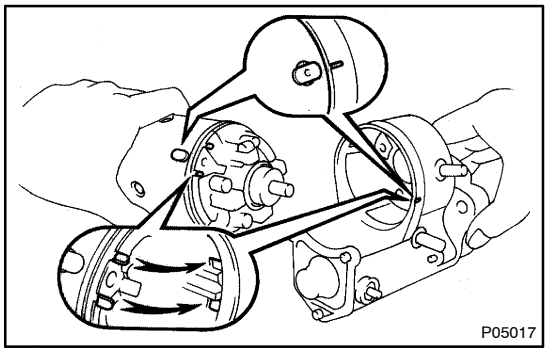
(f) Assemble the starter housing and magnet starter switch assy and install the 2 screws.

Torque: 9.3 N·m (95 kgf·cm, 82 in.·lbf)



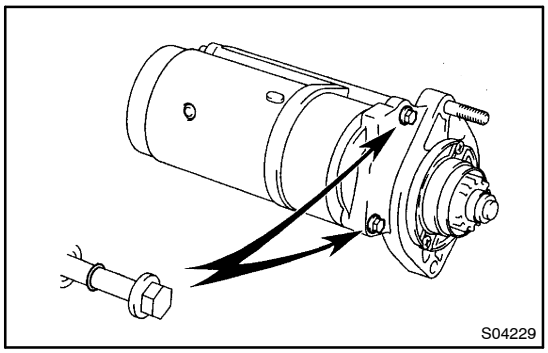
13. INSTALL STARTER YOKE ASSY

(a) Place a new O–ring in position on the starter yoke assy.



(b) Align the claws of the brush holder with the grooves of the magnet starter switch, and install the starter yoke assy and starter armature.

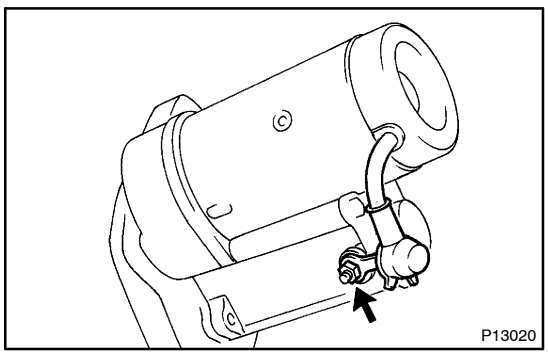
(c) Align the punch mark of the starter yoke assy with the line of the magnet starter switch.



(d) Install 2 new O–rings to the bolts.

(e) Install the starter yoke assy and starter armature with the 2 bolts.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



(f) Connect the lead wire to terminal C, and install the nut.

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