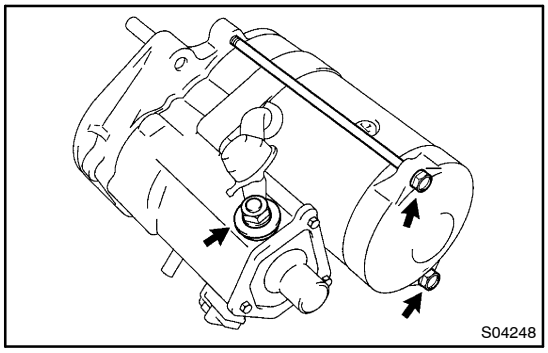
190I8–01

OVERHAUL

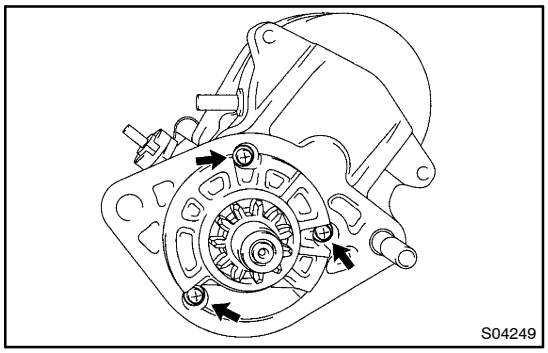


1. REMOVE STARTER YOKE ASSY

(a) Remove the nut and disconnect the terminal C wire.

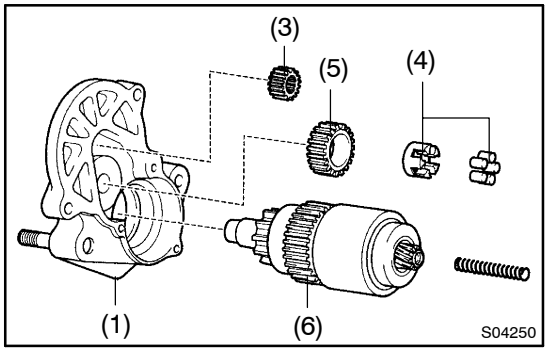
(b) Remove the 2 through bolts.

(c) Pull out the field frame together with the armature from the magnetic switch assembly.



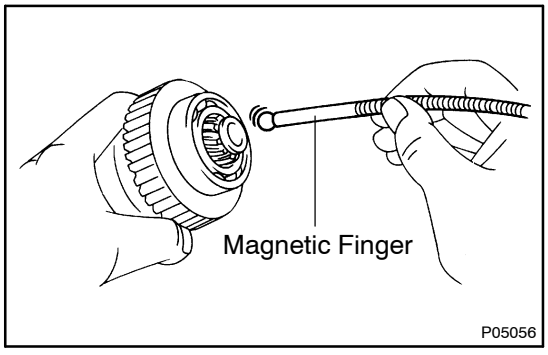
2. REMOVE MAGNET STARTER SWITCH ASSY

(a) Remove the 3 screws.

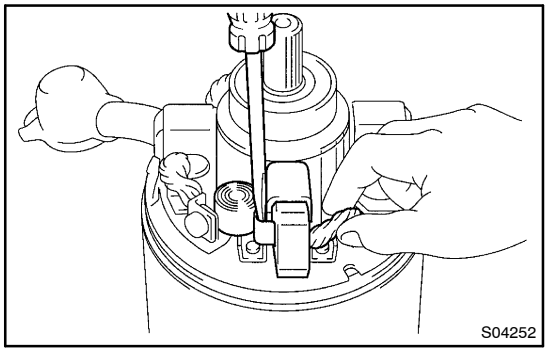


(b) Remove these parts from the magnetic switch assembly:

(1)	Starter housing
(2)	Return spring
(3)	Pinion gear
(4)	Bearing
(5)	Idler gear
(6)	Clutch assembly



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



3. REMOVE STARTER BRUSH HOLDER ASSY

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

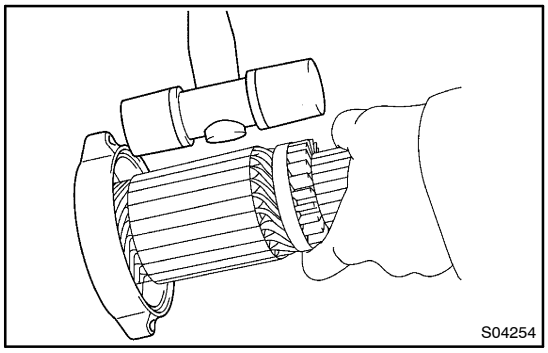
(b) Remove the brush holder from the starter yoke assy.

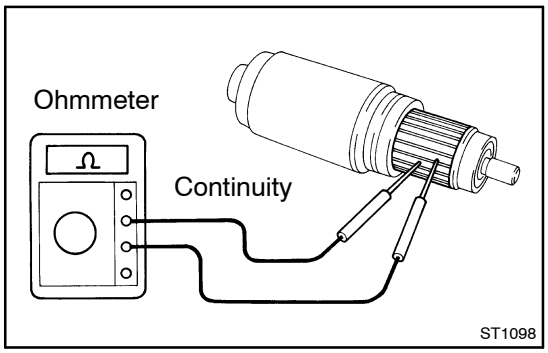
4. REMOVE STARTER ARMATURE ASSY

(a) Place match mark on the starter armature and commutator end frame.

(b) Remove armature with commutator end frame from starter yoke.

(c) Using a plastic hammer, tap the end cover to remove the armature from the end cover.



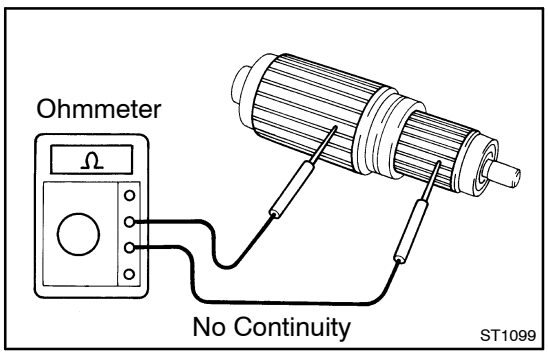


5. INSPECT STARTER ARMATURE ASSY

(a) Inspect 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.



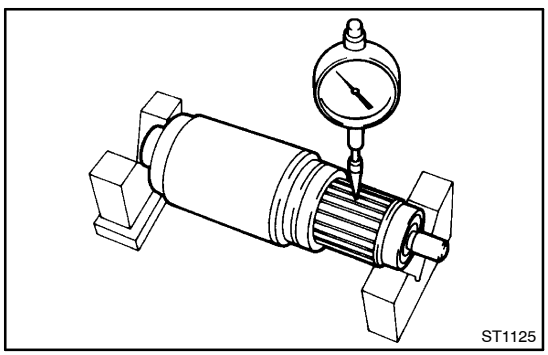
(b) Inspect commutator for ground.

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

If there is continuity, replace the armature.

(c) Inspect commutator for diary and burnt surface.

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



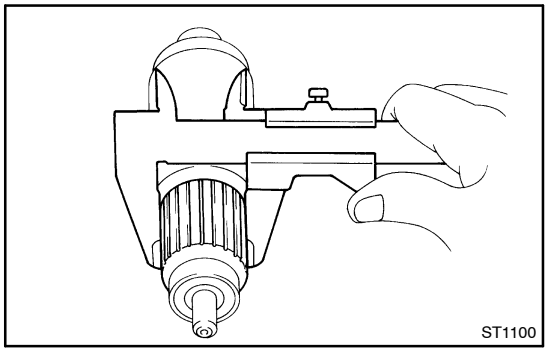
(d) Inspect commutator circle runout.

(1) Place the commutator on V–blocks.

(2) Using a dial indicator the circle runout.

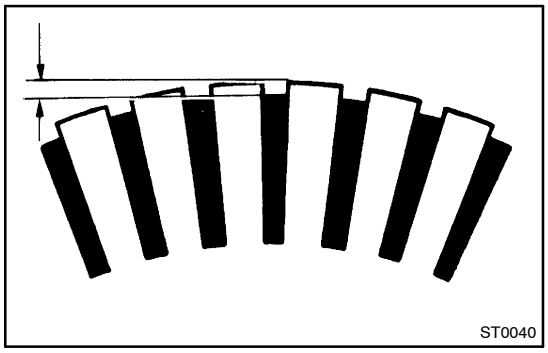
Maximum circle runout: 0.05 mm (0.0020 in.)

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



(e) Inspect commutator diameter.
(1) Using vernier calipers, measure the commutator diameter.
Standard diameter: 43.0 mm (1.692 in.)
Minimum diameter: 42.0 mm (1.654 in.)

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

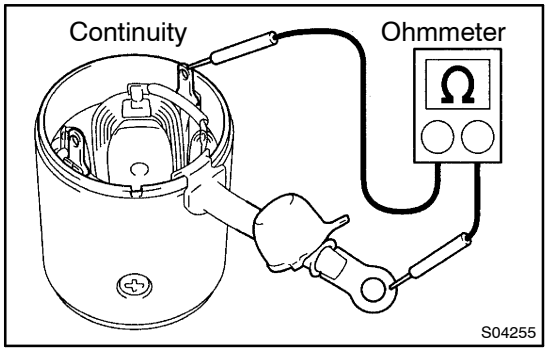


(f) Inspect undercut depth.
(1) Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.
Standard undercut depth: 0.7 mm (0.028 in.)
Minimum undercut depth: 0.2 mm (0.008 in.)

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

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

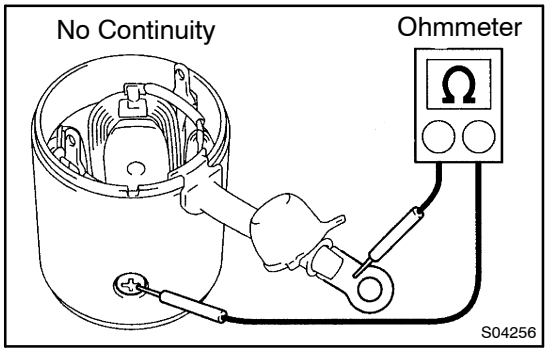
If resistance is felt or the bearing sticks, replace the starter armature assy.



6. INSPECT STARTER YOKE ASSY

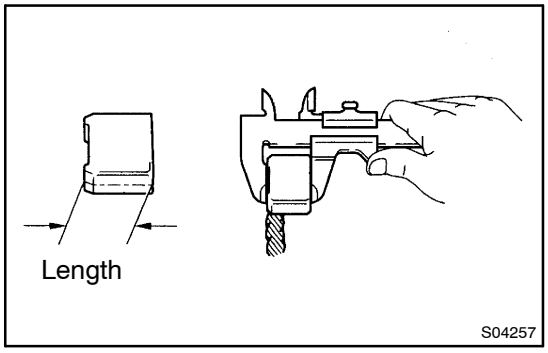
(a) Inspect field coil for open circuit.
(1) Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

If there is no continuity, replace the field frame.



(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 field frame.



7. INSPECT STARTER BRUSH HOLDER ASSY

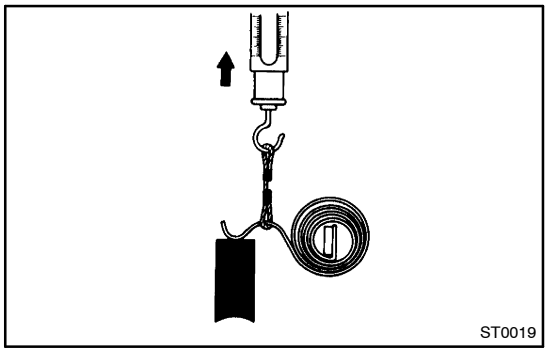
(a) Inspect brush length.

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

Standard length: 21.0 mm (0.828 in.)

Minimum length: 12.0 mm (0.472 in.)

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



(b) Inspect brush spring load.

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

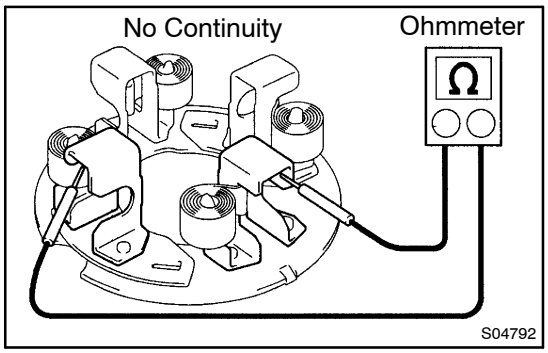
Standard spring installed load:

27.5 – 37.3 N (2.8 – 3.8 kgf, 6.1 – 8.3 lbf)

Minimum spring installed load:

14.7 N (1.5 kgf, 3.3 lbf)

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



(c) 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 brush holder.

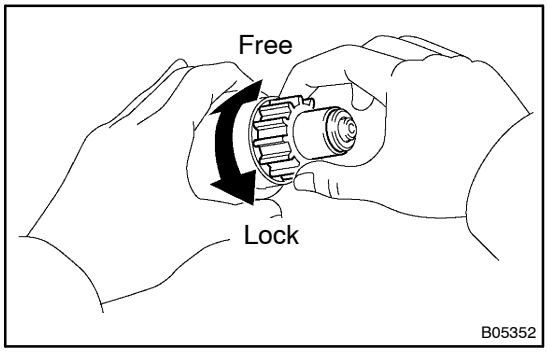
8. INSPECT STARTER CLUTCH SUB–ASSY

(a) Inspect gear teeth.

(1) Check the gear teeth on the pinion gear, idle gear and the clutch assembly for wear or damage.

If damaged, replace the gear or clutch assembly.

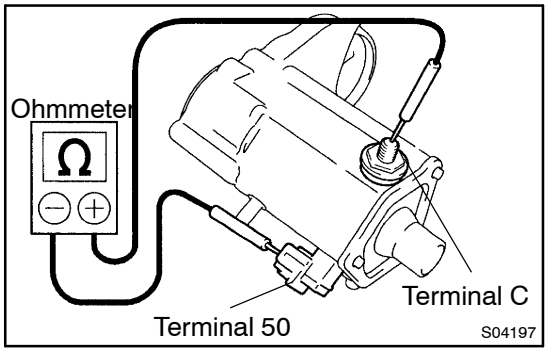
If damaged, also check the drive plate ring gear for wear or damage.



(b) Inspect clutch pinion gear.

(1) 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 clutch assembly.

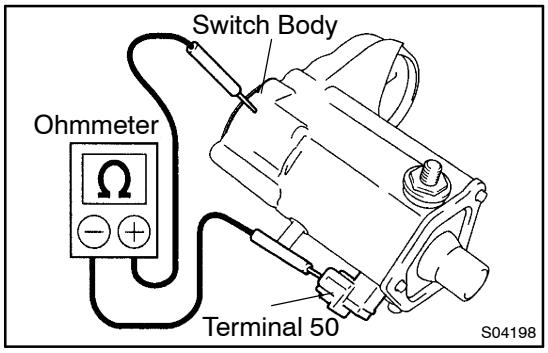


9. INSPECT MAGNET STARTER SWITCH ASSY

(a) Do pull–in coil open circuit test.

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

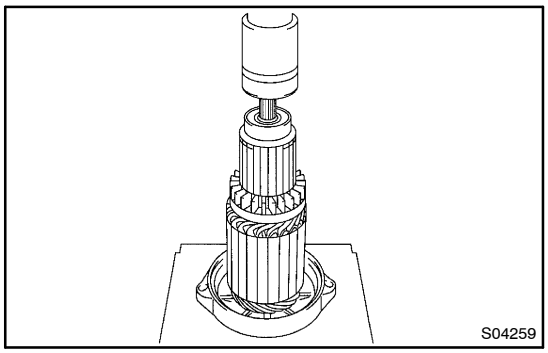
If there is no continuity, check and replace the magnetic switch.



(b) Do hold–in 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 magnetic switch.



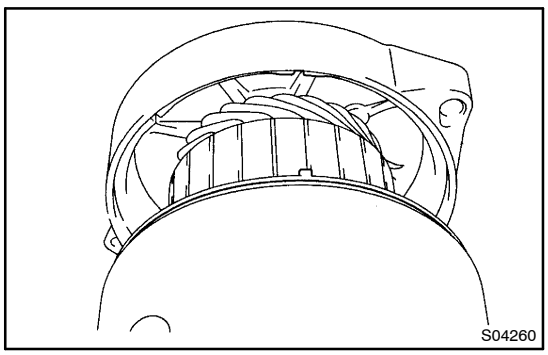
10. INSTALL STARTER ARMATURE ASSY

HINT:

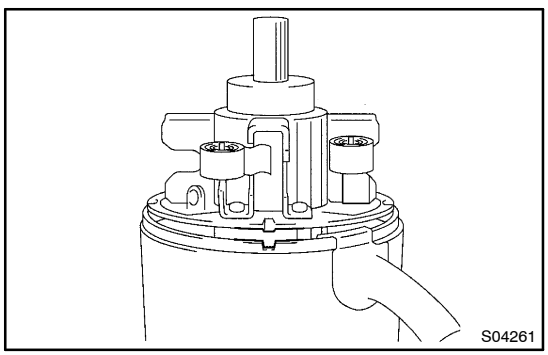
Use high–temperature grease to lubricate the bearings and gears when assembling the starter.

(a) Apply grease to the armature bearings.

(b) Using a press, press the armature into the end frame.



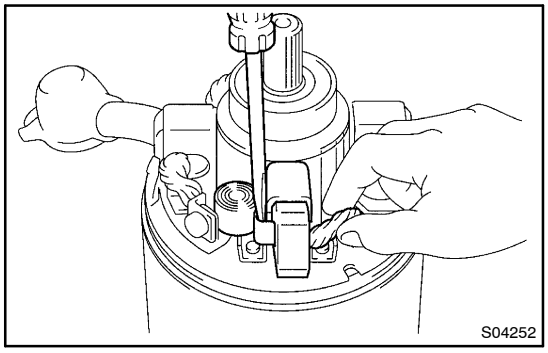
(c) Align the claw of the field frame with the groove of the end frame, install the armature end frame.



11. INSTALL STARTER BRUSH HOLDER ASSY

(a) Align the claw of the brush holder with the claw groove of the field frame.

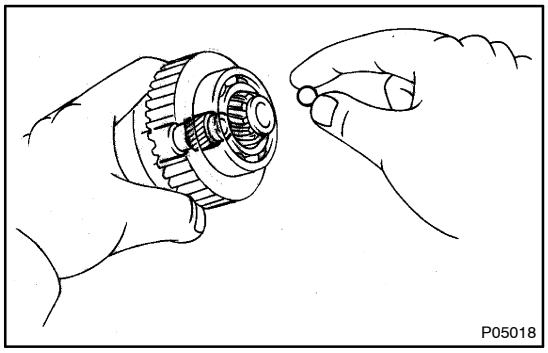
(b) Place the brush holder on the starter yoke assy.



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

NOTICE:

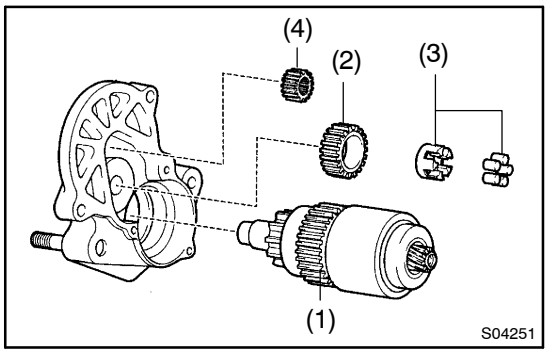
Check that the positive (+) lead wires are not grounded.



12. INSTALL MAGNET STARTER SWITCH ASSY

(a) Apply grease to the steel ball.

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

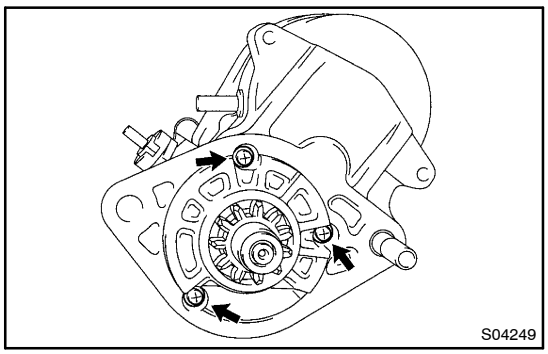


(c) Apply grease to the return spring.

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

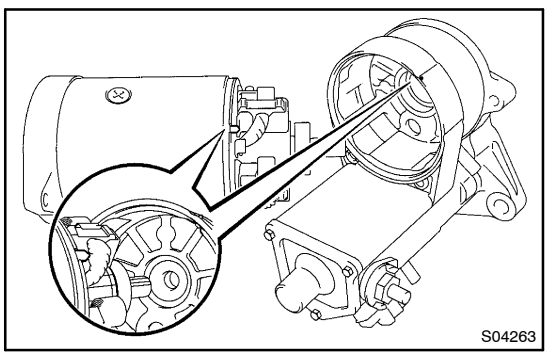
(e) Place there parts in position on the starter housing:

(1)	Clutch assembly
(2)	Idler gear
(3)	Bearing
(4)	Pinion gear



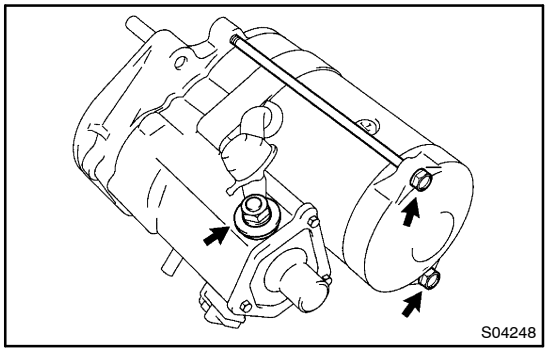
(f) Assemble the starter housing and magnetic switch assembly and install the 3 screws.

Torque: 11.3 N·m (115 kgf·cm, 8.5 ft·lbf)



13. INSTALL STARTER YOKE ASSY

(a) Align the claw of the brush holder with the groove of the magnetic switch, and install the field frame and armature shaft assembly.



(b) Install the field frame and armature assembly with the 2 through bolts.
Torque: 14 N·m (145 kgf·cm, 10 ft·lbf)

(c) Connect the lead wire to terminal C, and install the nut.
Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

(d) Install the 2 dust protectors.