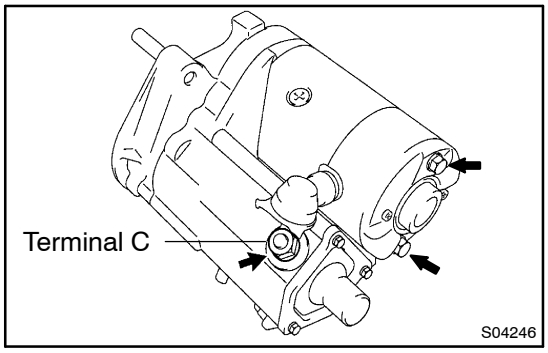
190IL–01

OVERHAUL

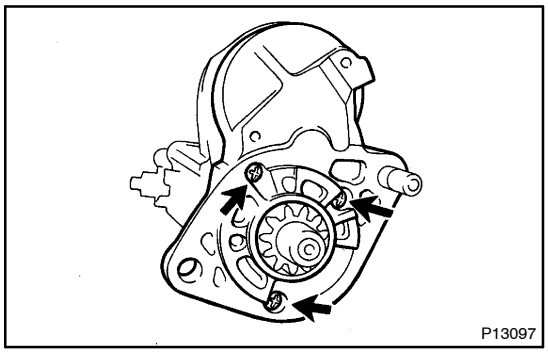


1. REMOVE STARTER YOKE ASSY

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

(b) Remove the 2 bolts and starter yoke assy with the starter armature assy.

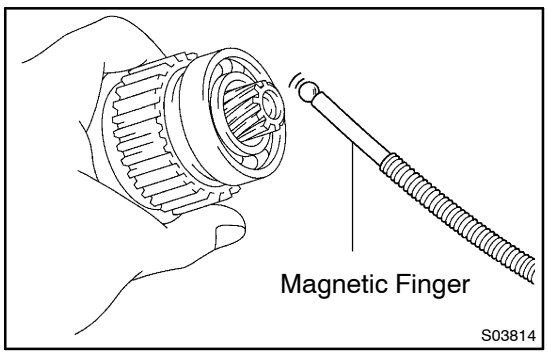
(c) Remove the felt washer.



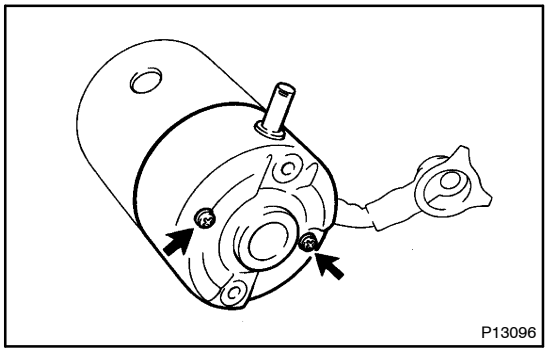
2. REMOVE MAGNET STARTER SWITCH ASSY

(a) Remove the 3 screws and magnet starter switch assy.

(b) Remove the starter drive housing ,starter clutch sub–assy, return spring, starter idle pinion, retainer and 5 clutch rollers.

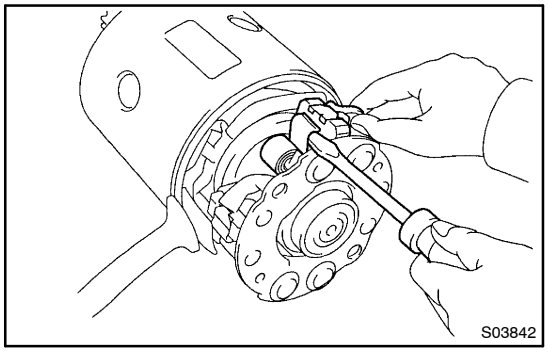


(c) Using a magnetic finger, remove the steel ball.



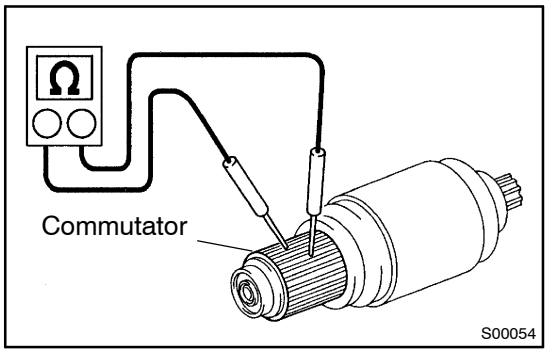
3. REMOVE STARTER BRUSH HOLDER ASSY

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



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

4. REMOVE STARTER ARMATURE ASSY

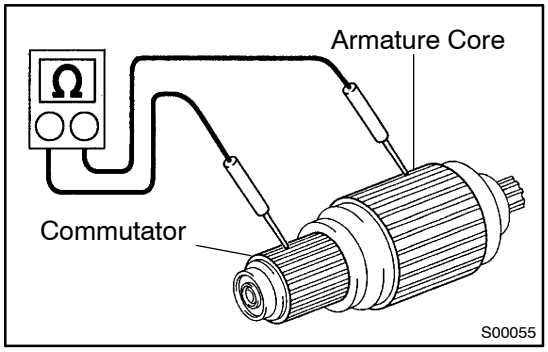


5. INSPECT STARTER ARMATURE ASSY

If the surface of the commutator is dirty or burned, polish the part with sandpaper (#400) or replace the armature.

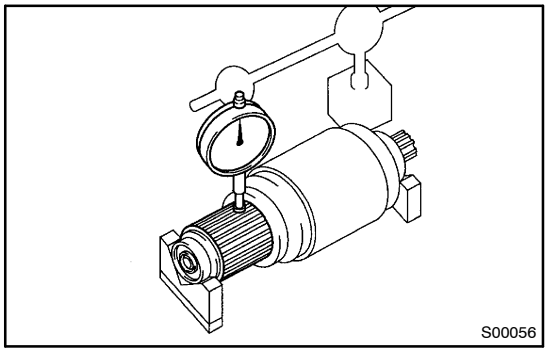
(a) Check the commutator open circuit.
  (1) Using an ohmmeter, check that there is continuity between the segments of the commutator.

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



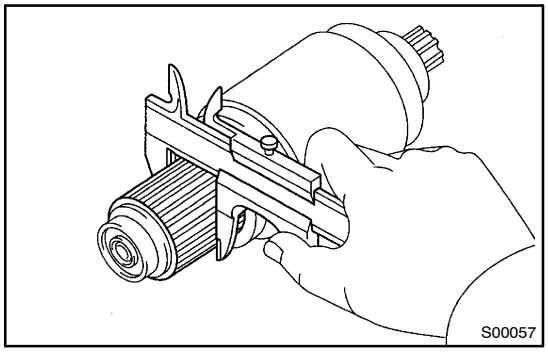
(b) Check the commutator ground.
  (1) Using an ohmmeter, check that there is no continuity between the commutator and armature core.

If there is continuity, replace the armature.



(c) Check the commutator circle runout.
  (1) Place the armature on the V–blocks.
  (2) 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, correct it with sandpaper (#400) or replace the armature.

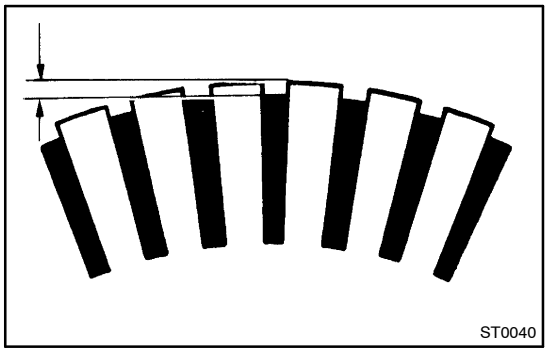


(d) Using vernier calipers, measure the commutator diameter.

Diameter:

Standard	36.0 mm (1.42 in.)
Minimum	35.0 mm (1.38 in.)

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



(e) Measure the undercut depth of commutator.

Depth:

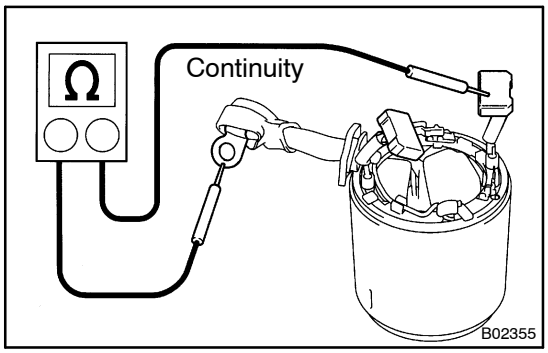
Standard	0.7 mm (0.028 in.)
Minimum	0.2 mm (0.008 in.)

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

(f) Inspect the bearings.

(g) Check that the bearings rotate smoothly.

If necessary, replace the starter armature assy.

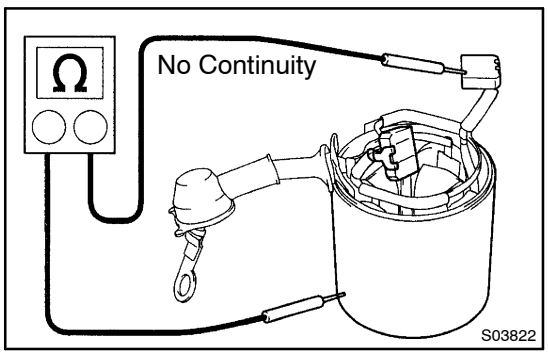


6. INSPECT STARTER YOKE ASSY

(a) Inspect for open circuit.

(1) Check that there is continuity between the terminal C wire and brushes.

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

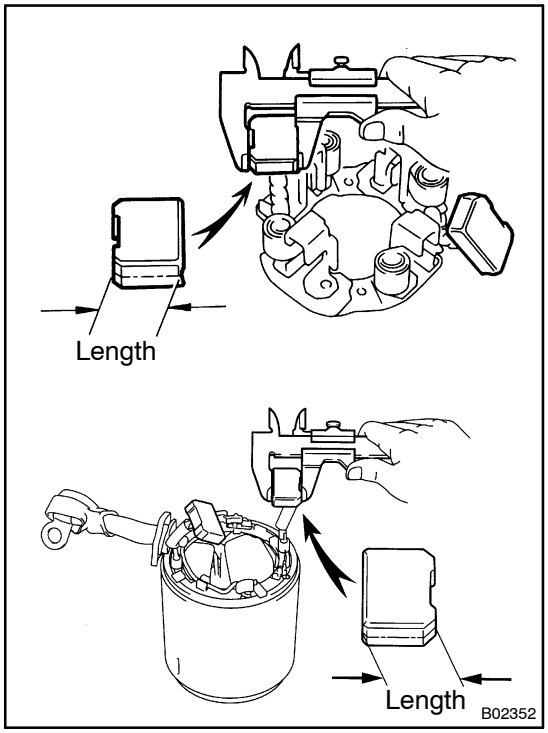


(b) Inspect for ground.

(1) Check that there is no continuity between the brushes and starter yoke body.

(2) Check that there is no continuity between the terminal C wire and starter yoke body.

If there is continuity, replace the starter yoke assy.

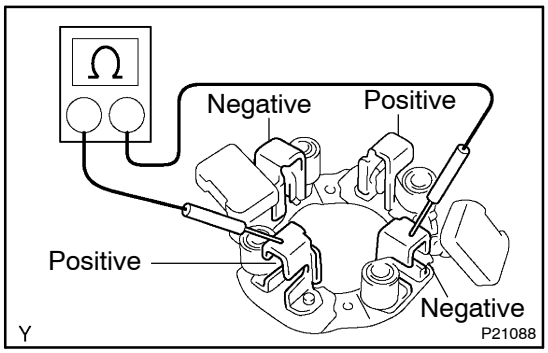


7. INSPECT BRUSH

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

Standard	20.5 mm (0.807 in.)
Minimum	11.0 mm (0.433 in.)

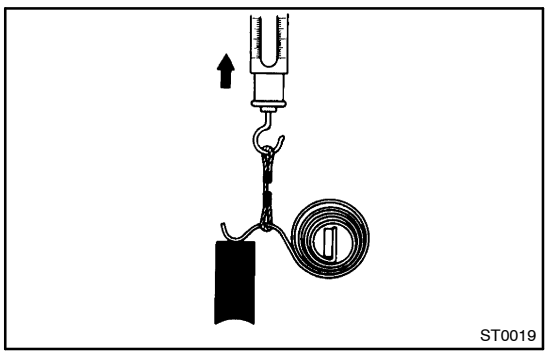
If the length is less than the minimum, replace the brush holder and starter yoke assy.



8. INSPECT STARTER BRUSH HOLDER ASSY

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

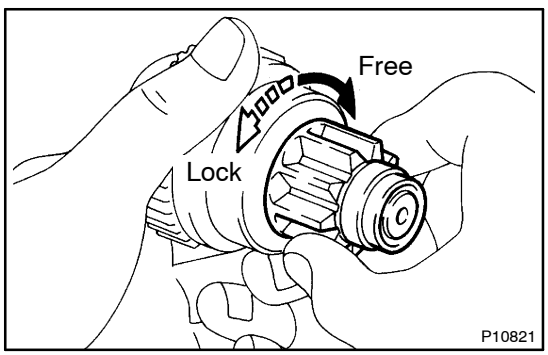
If there is continuity, replace the brush holder.



(b) Using a pull scale, measure the brush spring load.
Spring load:

Standard	34.3 – 42.1 N (3.5 – 4.3 kgf, 7.7 – 9.5 lbf)
Minimum	18.6 N (1.9 kgf, 4.2 lbf)

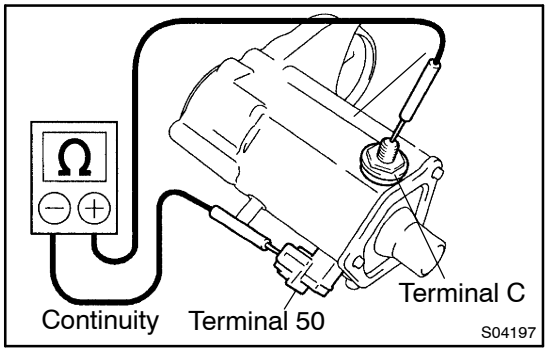
If the spring load is less than the minimum, replace the brush springs.



9. INSPECT STARTER CLUTCH SUB–ASSY

(a) Check that the starter clutch operates.

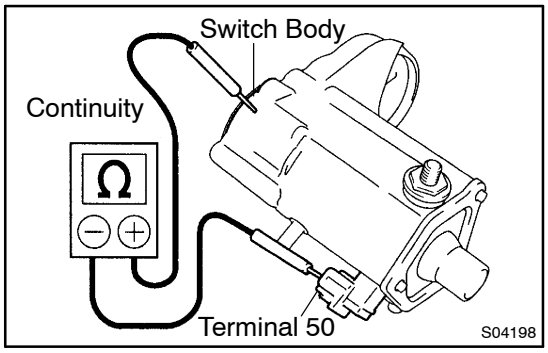
If the starter clutch is does not operate, replace it.



10. INSPECT MAGNET STARTER SWITCH ASSY

(a) Check the pull–in coil continuity.
  (1) Using an ohmmeter, check that there is continuity between terminals 50 and C.

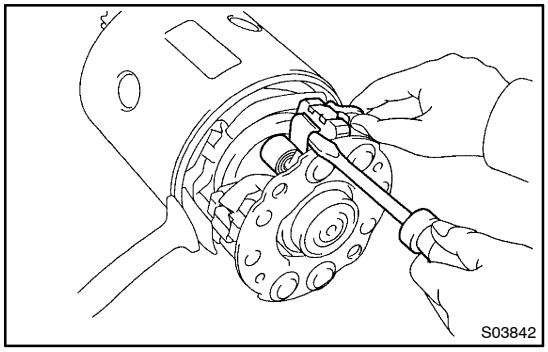
If there is no continuity, replace the magnet starter switch assy.



(b) Check the holding coil continuity.
  (1) Using an ohmmeter, check that there is continuity between terminals 50 and switch body.

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

11. INSTALL STARTER ARMATURE ASSY

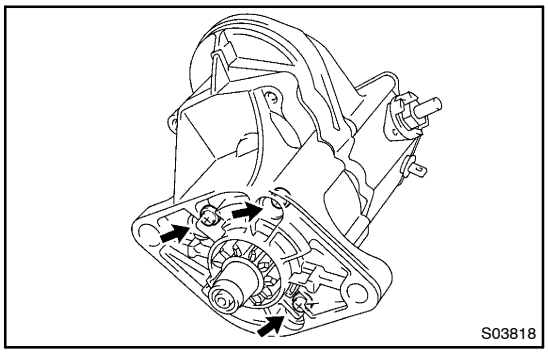


12. INSTALL STARTER BRUSH HOLDER ASSY

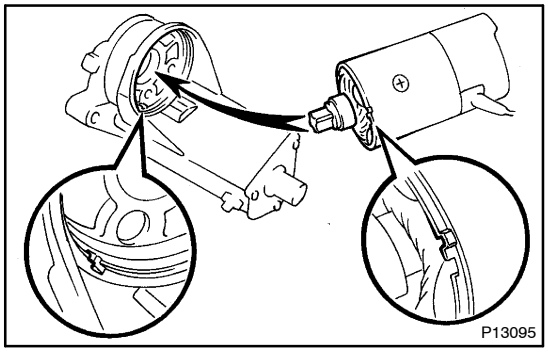
(a) Place the brush holder on the armature.
(b) Using a screwdriver, install the 4 brushes.
(c) Install the commutator end frame with the 2 screws.
  Torque: 3.6 N·m (37 kgf·cm, 32 in.·lbf)

13. INSTALL MAGNET STARTER SWITCH ASSY

(a) Apply the high–temperature grease to the steel ball, return spring, 5 clutch rollers and starter idle pinion.
(b) Install the steel ball.
(c) Install the return spring.
(d) Install the starter clutch sub–assy.
(e) Install the 5 clutch rollers, the retainer and starter idle pinion.



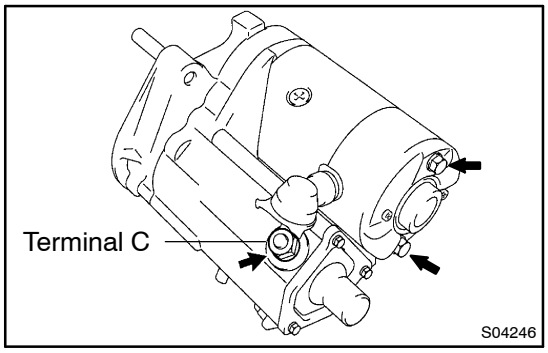
(f) Install the magnet starter switch assy with the 3 screws.
  Torque: 9.3 N·m (95 kgf·cm, 82 in.·lbf)



14. INSTALL STARTER YOKE ASSY

(a) Place the felt washer on the armature shaft.

(b) Align the protrusion of the starter yoke assy with the cut-out of the magnet starter switch assy.



(c) Install the starter yoke assy with the 2 through bolts.
Torque: 9.3 N·m (95 kgf·cm, 82 in.·lbf)

(d) Connect the terminal C wire with the nut.
Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

(e) Install 2 new dust protectors.