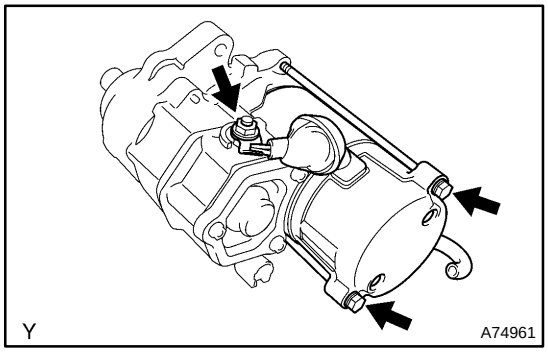
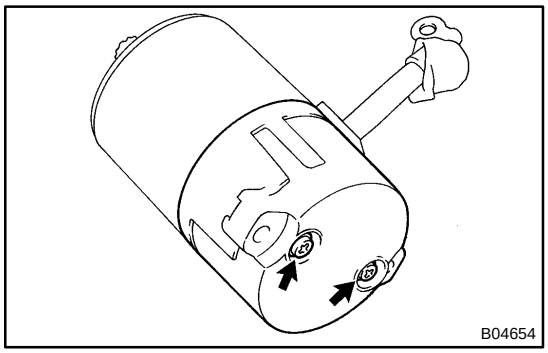
190F7-01

OVERHAUL



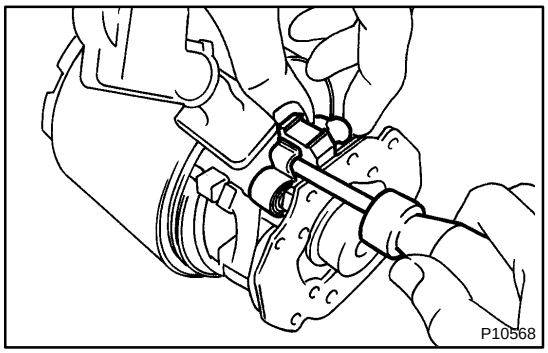
1. REMOVE STARTER YOKE ASSY

(a) Remove the nut and disconnect the terminal C wire.
(b) Remove the 2 through bolts.
(c) Pull out the starter yoke assy with the armature assy.
(d) Remove the O-ring from the starter yoke assy.



2. REMOVE STARTER BRUSH HOLDER ASSY

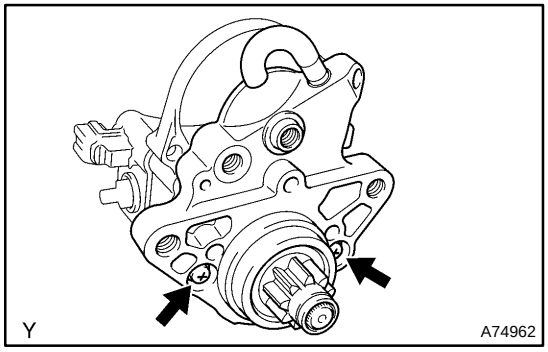
(a) Remove the 2 screws w/ O-ring and end cover from the field frame.
(b) Remove the O-ring from the field frame.



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

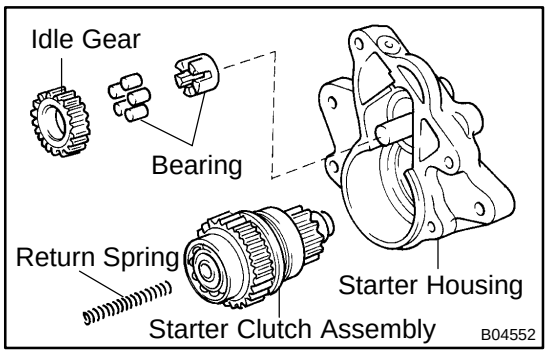
3. REMOVE STARTER ARMATURE ASSY

(a) Remove the starter armature assy from starter yoke assy.

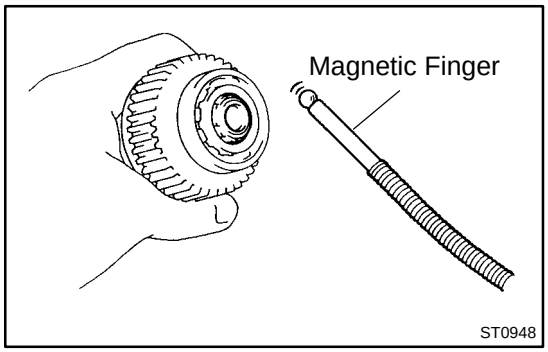


4. REMOVE STARTER CLUTCH

(a) Remove the 2 screws and starter drive housing.



(b) Remove return spring idler gear, bearing and starter clutch assembly from the starter housing.

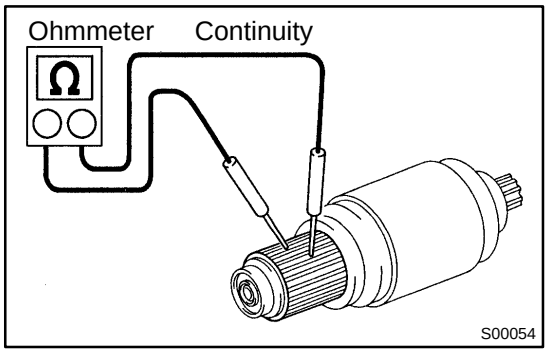


(c) Using a magnetic finger, remove the steel ball from the clutch shaft hole.

5. INSPECT STARTER ARMATURE ASSY

(a) Inspect commutator for dirty and burnt surface.

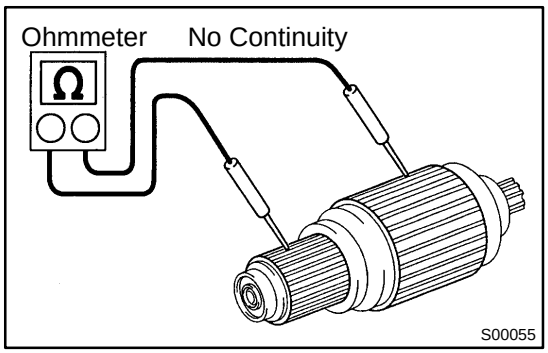
If the surface of the commutator is dirty or burned, polish the part with sandpaper (#400) or replace the armature.



(b) Inspect commutator for open circuit.

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

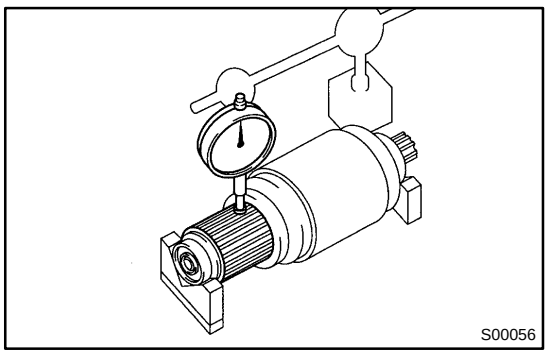
If there is no continuity between any segment, replace the armature.



(c) Inspect commutator for ground.

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

If there is continuity, replace the armature assy.



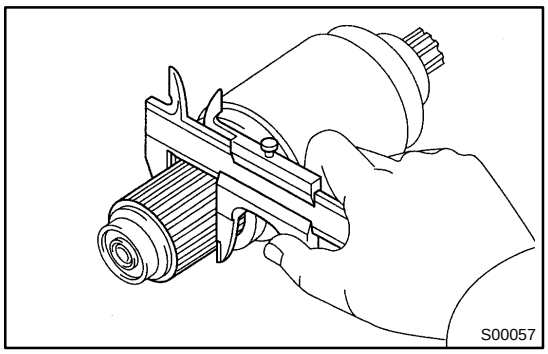
(d) Inspect commutator circle runout.

(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 on a lathe.



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

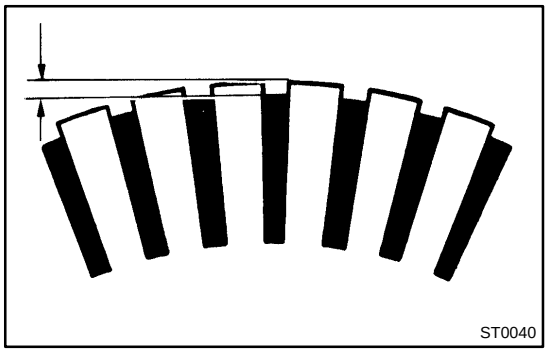
Standard diameter:

1.4 kW type	30.0 mm (1.181 in.)
2.0 kW type	35.0 mm (1.378 in.)

Minimum diameter:

1.4 kW type	29.0 mm (1.142 in.)
2.0 kW type	34.0 mm (1.339 in.)

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



(f) Measure the undercut depth of commutator.

Standard undercut depth:

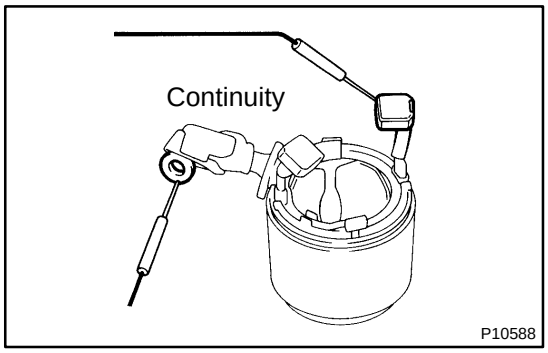
1.4 kW type	0.6 mm (0.024 in.)
2.0 kW type	0.7 mm (0.028 in.)

Minimum undercut depth: 0.2 mm (0.008 in.)

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

(g) Inspect the bearings.

(1) Check that the bearing rotates smoothly.

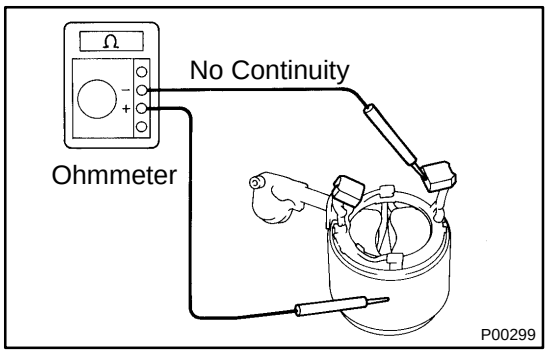


6. INSPECT STARTER YOKE ASSY

(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.

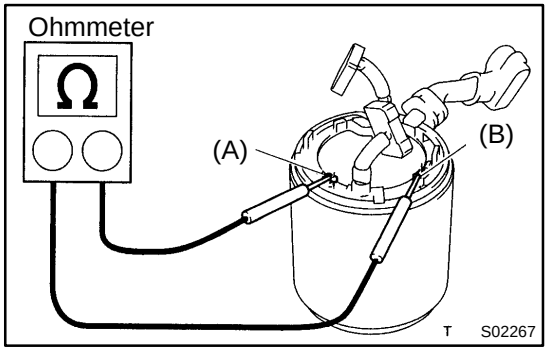
If there is no continuity, replace the starter yoke assy.



(b) Inspect that field coil is not grounded (1.4 kW type).

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

If there is continuity, replace the starter yoke assy.



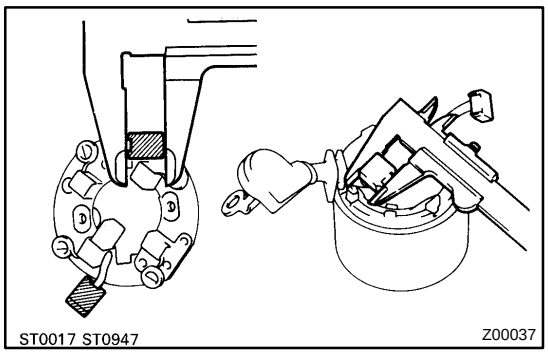
(c) Inspect shunt coil for open circuit (2.0 kW type).

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

Resistance:

1.5 - 1.9 Ω at 20°C (68°F)

If the resistance is not as specified, replace the starter yoke assy.



7. INSPECT BRUSH

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

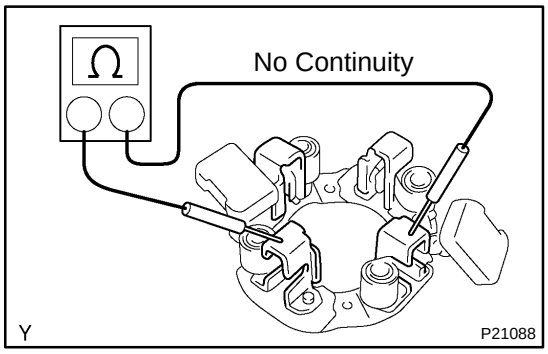
Standard length:

1.4 kW type	15.5 mm (0.610 in.)
2.0 kW type	15.0 mm (0.591 in.)

Minimum length:

1.4 kW type	10.0 mm (0.394 in.)
2.0 kW type	9.0 mm (0.354 in.)

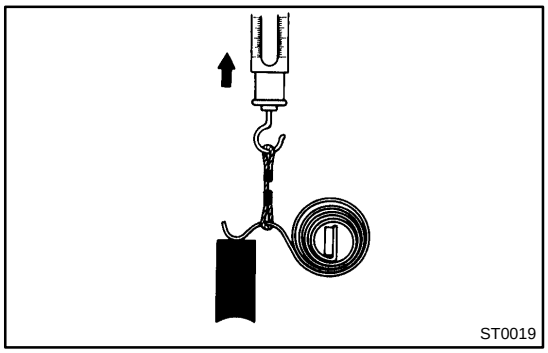
If the length is less than the minimum, replace the brush holder and starter yoke assy.



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

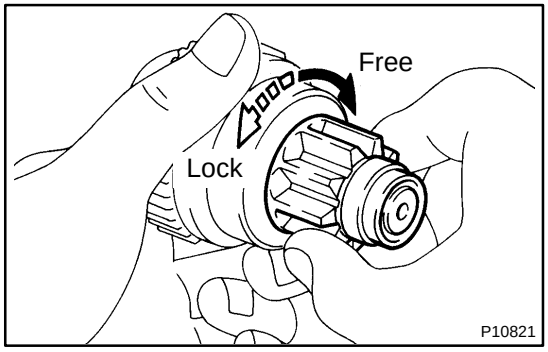
Standard spring installed load:

1.4 kW type	17.6 - 23.5 N (1.8 - 2.4 kgf, 4.0 - 5.3 lbf)
1.2 kW type	21.5 - 27.5 N (2.2 - 2.8 kgf, 4.8 - 6.2 lbf)

Minimum spring installed load:

1.4 kW type	11.8 N (1.2 kgf, 2.7 lbf)
1.2 kW type	12.7 N (1.3 kgf, 2.9 lbf)

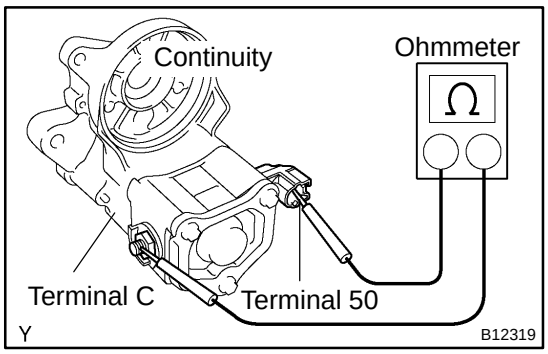
If the spring load is less than the minimum, replace the brush springs.



9. INSPECT STARTER CLUTCH

(a) Rotate the pinion gear clockwise, and check that it turns freely. Try to rotate the pinion gear counterclockwise and check that it locks.

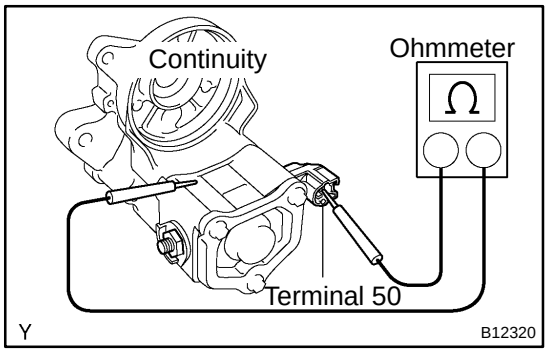
If necessary, replace the clutch assembly.



10. INSPECT STARTER MAGNETIC SWITCH ASSY

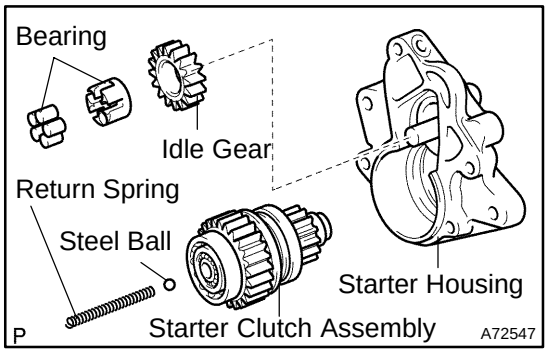
(a) Check the pull-in coil continuity.
   (1) Using an ohmmeter, check that there is continuity between terminals 50 and C.

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



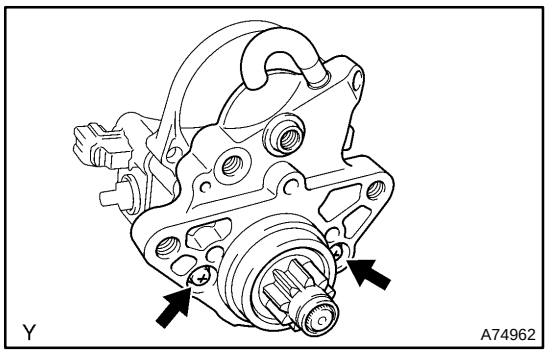
(b) Check the holding coil continuity.
   (1) Using an ohmmeter, check that there is continuity between terminals 50 and switch body.

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



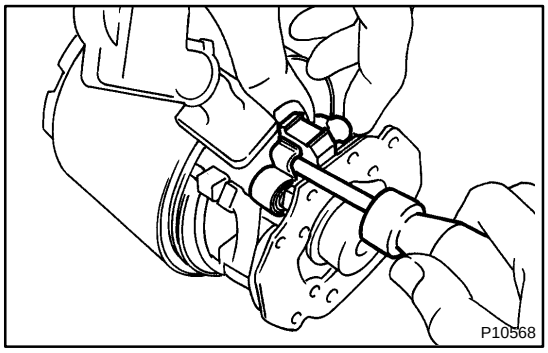
11. INSTALL STARTER DRIVE HOUSING

(a) Apply grease to the steel ball, return spring, clutch rollers and starter idler pinions.
(b) Install the steel ball.
(c) Install a new O-ring to the starter housing.
(d) Insert the return spring into the magnet starter switch hole.
(e) Install the starter clutch assembly, idler gear and bearing.



(f) Install the starter housing to the magnet magnet switch assy with the 2 screws.

Torque:
1.4 kW type 5.9 N·m (60 kgf·cm, 52 in.·lbf)
2.0 kW type 9.3 N·m (95 kgf·cm, 82 in.·lbf)



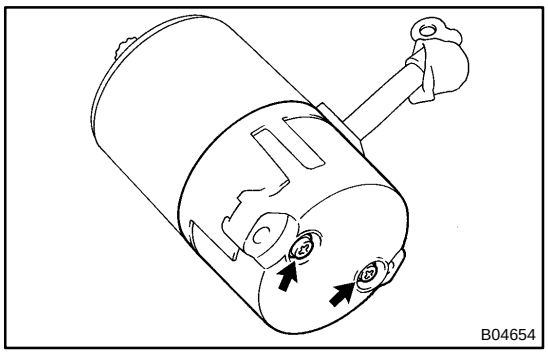
12. INSTALL STARTER BRUSH HOLDER ASSY

(a) Align the claw of the brush holder with the claw groove of the starter yoke assy.
(b) Place the brush holder on the starter yoke assy.
(c) Using a screwdriver, hold the brush spring back.
(d) Connect the brush into the brush holder.
(e) Connect the 4 brushes.

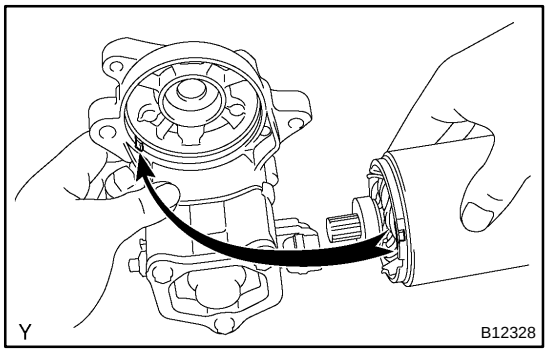
NOTICE:

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

(f) Install a O-ring to the groove of the starter yoke.



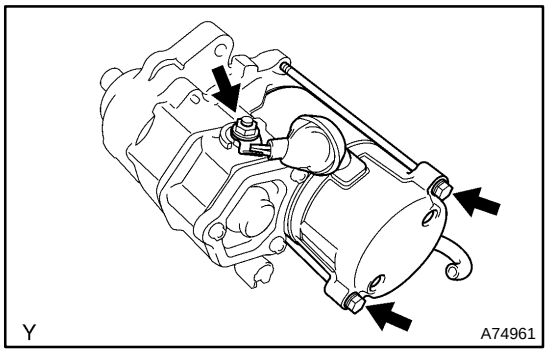
(g) Install new 2 O-rings and the end cover with the 2 screws.
Torque:
1.4 kW type 1.5 N·m (15 kgf·cm, 13 in.·lbf)
2.0 kW type 3.8 N·m (39 kgf·cm, 34 in.·lbf)



13. INSTALL STARTER YOKE ASSY

(a) Install a O-ring to the groove of the starter yoke assy.

(b) Align the protrusion of the starter yoke assy with the groove of the magnetic switch.



(c) Install the starter yoke assy with the 2 through bolts.
Torque:
1.4 kW type 5.9 N·m (60 kgf·cm, 52 in.·lbf)
2.0 kW type 9.3 N·m (95 kgf·cm, 82 in.·lbf)

(d) Connect the terminal C wire with the nut.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)