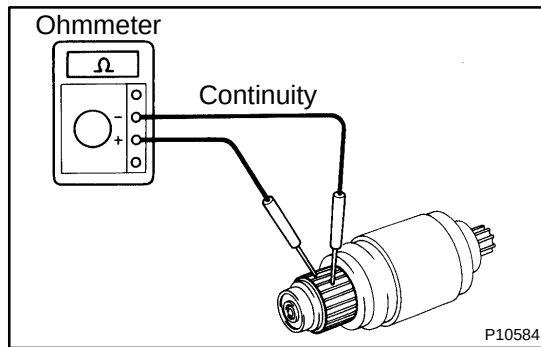


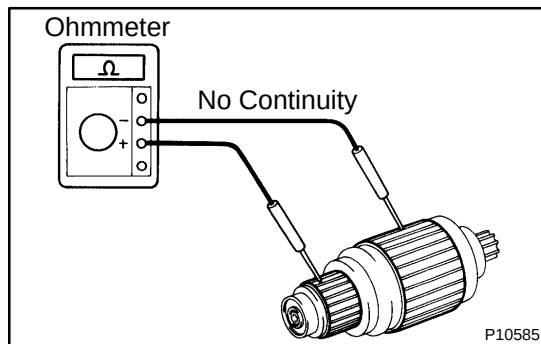


INSPECTION

1. INSPECT COMMUTATOR FOR OPEN CIRCUIT

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.



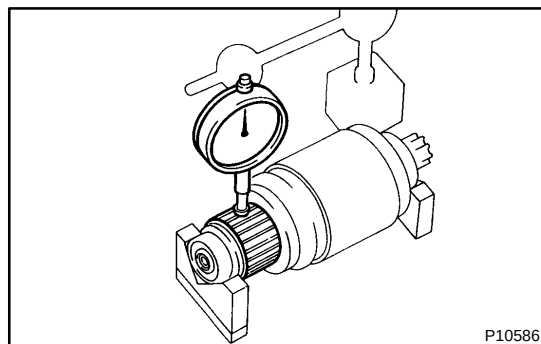
2. INSPECT COMMUTATOR FOR GROUND

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

If there is continuity, replace the armature.

3. INSPECT COMMUTATOR FOR DIRTY AND BURNT SURFACES

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



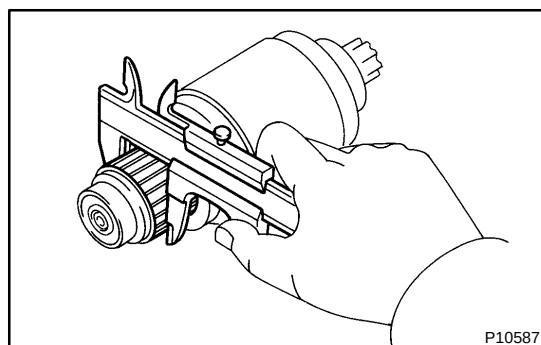
4. INSPECT COMMUTATOR CIRCLE RUNOUT

(a) Place the commutator on V-blocks.

(b) 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.



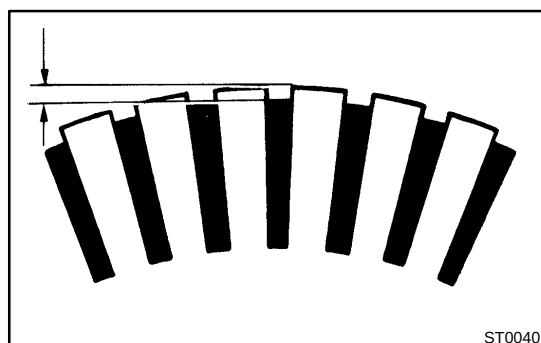
5. INSPECT COMMUTATOR DIAMETER

Using a vernier caliper, 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.



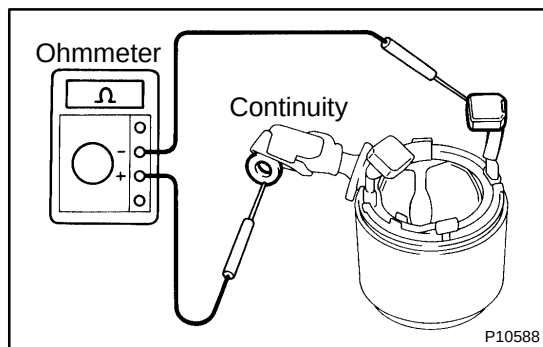
6. INSPECT UNDERCUT DEPTH

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.)

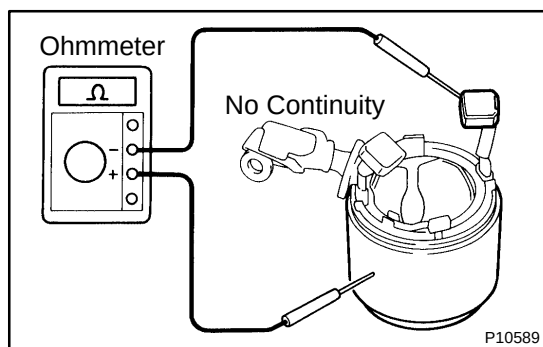
If the undercut depth is less than minimum, correct it with a hacksaw blade.



7. INSPECT FIELD COIL FOR OPEN CIRCUIT

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

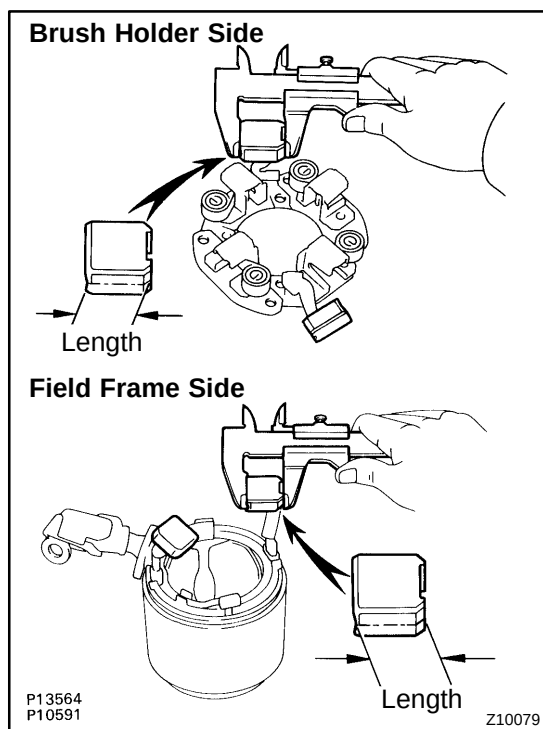
If there is no continuity, replace the field frame.



8. INSPECT FIELD COIL FOR GROUND

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.



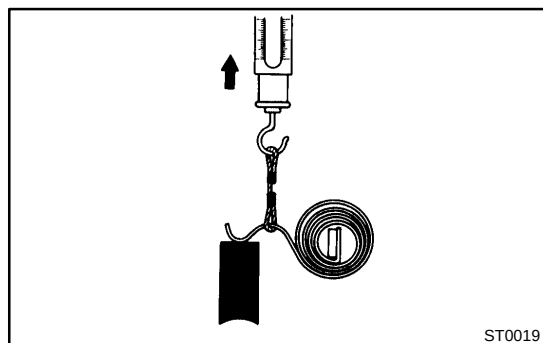
9. INSPECT BRUSH LENGTH

Using a vernier caliper, measure the brush length.

Standard length: 15.5 mm (0.610 in.)

Minimum length: 10.0 mm (0.394 in.)

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



10. INSPECT BRUSH SPRING LOAD

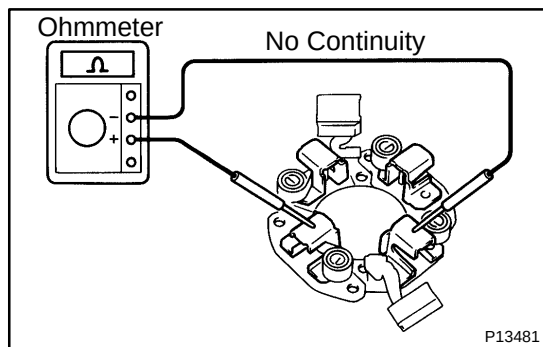
Take the pull scale reading the instant the brush spring separates from the brush.

Standard spring installed load:

17.6 - 23.5 N (1.8 - 2.4 kgf, 3.9 - 5.3 lbf)

Minimum spring installed load: 11.8 N (1.2 kgf, 2.6 lbf)

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



11. INSPECT BRUSH HOLDER INSULATION

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

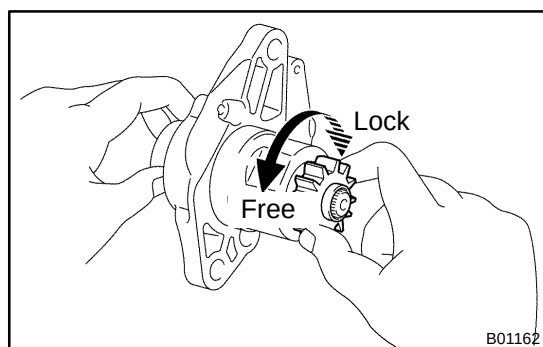
If there is continuity, repair or replace the brush holder.

12. INSPECT GEAR TEETH

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.

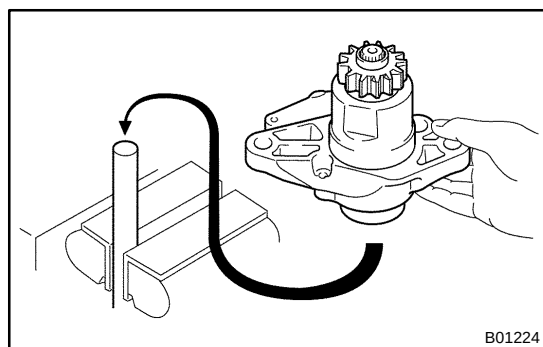
If damaged, also check the drive plate ring gear for wear or damage.



13. INSPECT CLUTCH

Hold the starter clutch and rotate the pinion gear counterclockwise, and check that it turns freely. Try to rotate the pinion gear clockwise and check that it locks.

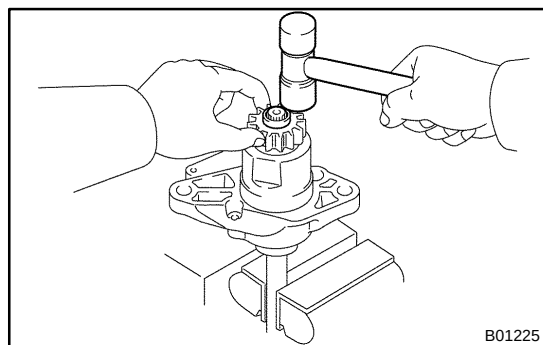
If necessary, replace the clutch assembly.



14. IF NECESSARY, REPLACE CLUTCH ASSEMBLY

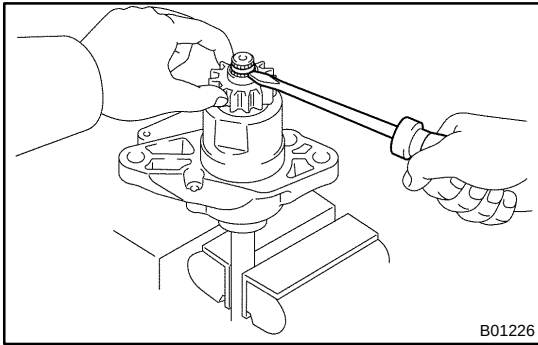
(a) Disassemble the starter housing and clutch assembly.

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

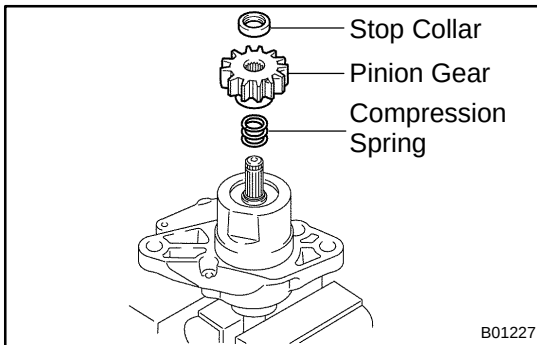


(2) Push down the pinion gear.

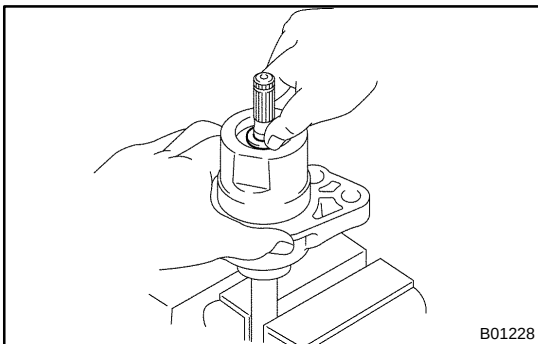
(3) Using a plastic-faced hammer, tap down the stop collar.



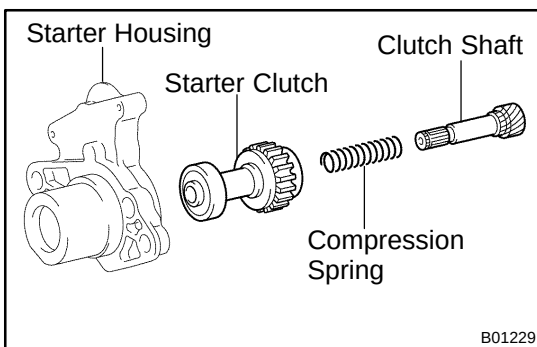
- (4) Using a screwdriver, pry out the snap ring.



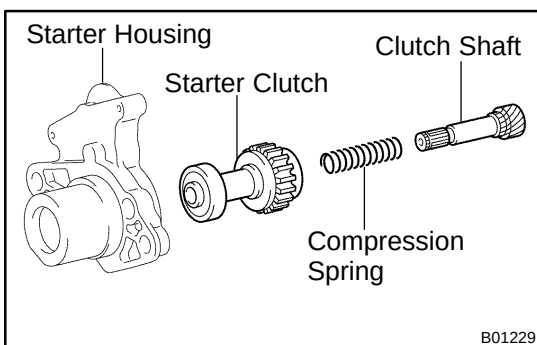
- (5) Remove these parts:
- Stop collar
 - Pinion gear
 - Compression spring



- (6) Push down the starter housing, and remove the spring retainer.

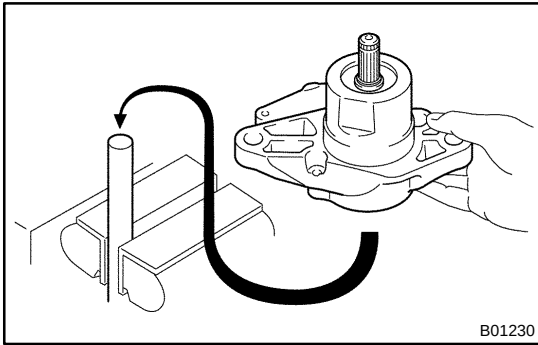


- (7) Disassemble these parts:
- Starter housing
 - Starter clutch
 - Compression spring
 - Clutch shaft

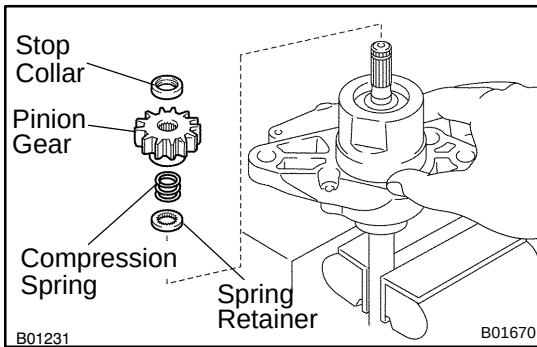


- (b) Assemble the starter housing and clutch assembly.

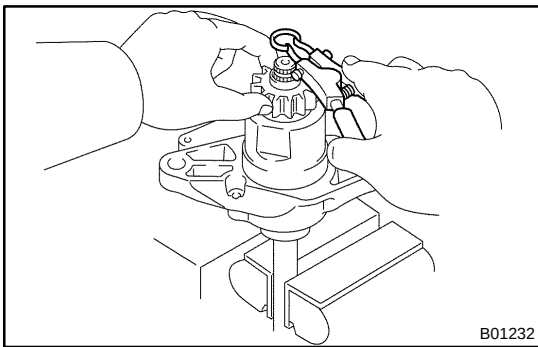
- (1) Assemble these parts:
- Starter housing
 - Starter clutch
 - Compression spring
 - Clutch shaft



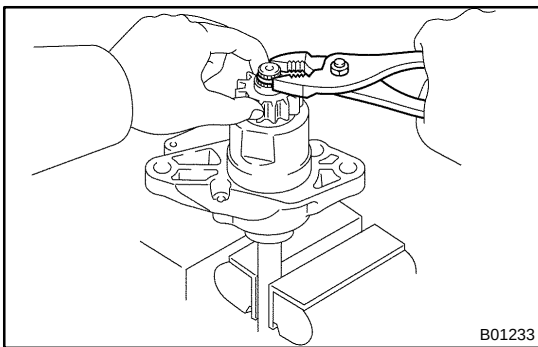
- (2) Mount a brass bar in a vise, install the starter housing and clutch assembly to the brass bar.



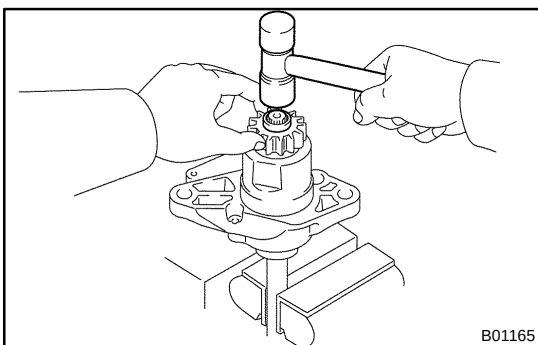
- (3) Push down the starter housing, and install these parts:
- Spring retainer
 - Compression spring
 - Pinion gear
 - Stop collar



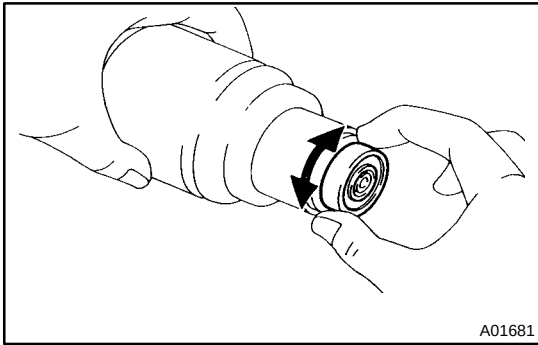
- (4) Push down the pinion gear.
(5) Using snap ring pliers, install a new snap ring.



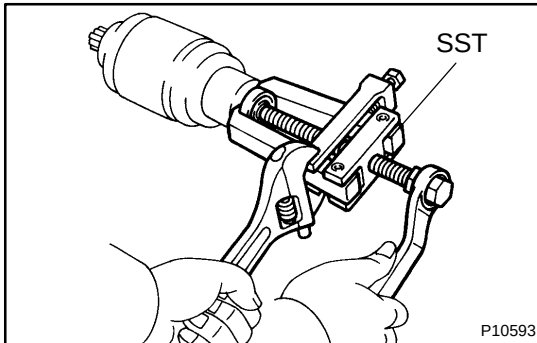
- (6) Using pliers, compress the snap ring.
(7) Check that the snap ring fits correctly.



- (8) Remove the starter housing and clutch assembly from the brass bar.
(9) Using a plastic-faced hammer, tap the clutch shaft and install the stop collar onto the snap ring.

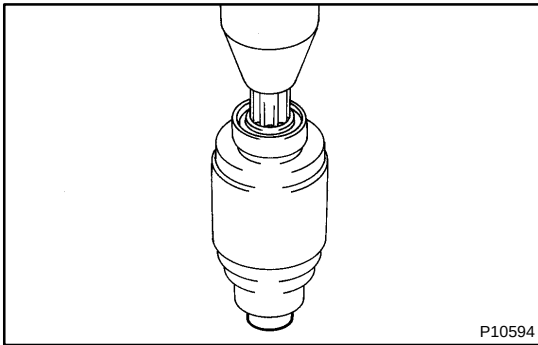
**15. INSPECT REAR BEARING**

Turn each bearing by hand while applying inward force.
If resistance is felt or the bearing sticks, replace the bearing.

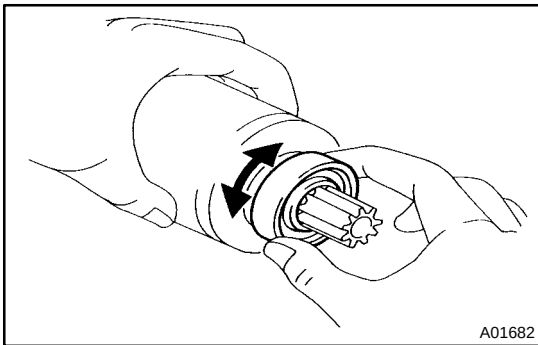
**16. IF NECESSARY, REPLACE REAR BEARING**

(a) Using SST, remove the bearing.

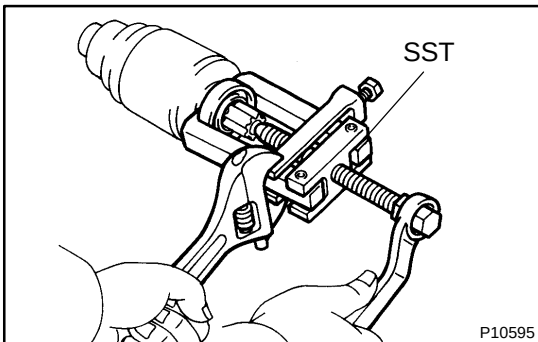
SST 09286-4601 1



(b) Using a press, press in a new bearing.

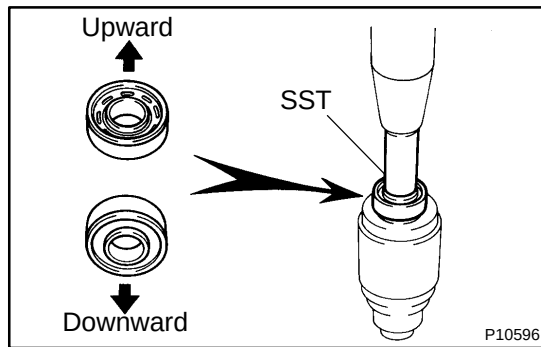
**17. INSPECT FRONT BEARING**

Turn each bearing by hand while applying inward force.
If resistance is felt or the bearing sticks, replace the bearing.

**18. IF NECESSARY, REPLACE FRONT BEARING**

(a) Using SST, remove the bearing.

SST 09286-4601 1

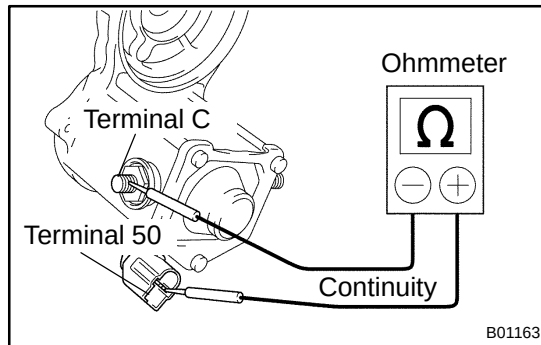


(b) Using SST and a press, press in a new bearing.

NOTICE:

Be careful of the bearing installation direction.

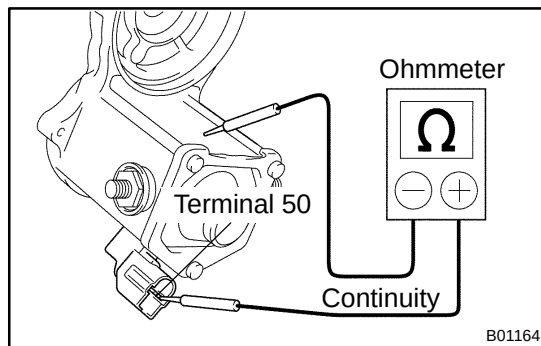
SST 09820-00030



19. INSPECT MAGNETIC SWITCH PULL-IN COIL OPEN CIRCUIT

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

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



20. INSPECT MAGNETIC SWITCH HOLD-IN COIL OPEN CIRCUIT

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

If there is no continuity, replace the magnetic switch.