

# C ENGINE ELECTRICAL

1KR-FE-----	C - 1
ARTICLES TO BE PREPARED-----	C - 1
STARTER-----	C - 1
CIRCUIT DIAGRAM-----	C - 1
UNIT CHECK -----	C - 2
DISASSEMBLING AND ASSEMBLING -----	C - 3
DISASSEMBLING AND ASSEMBLING -----	C - 8
ALTERNATOR -----	C - 21
DISASSEMBLING AND ASSEMBLING -----	C - 21
CIRCUIT DIAGRAM-----	C - 22

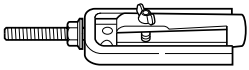
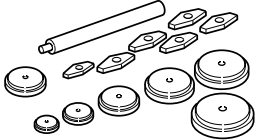
# C-1

## 1 1KR-FE

### 1-1 ARTICLES TO BE PREPARED

#### 1-1-1 ARTICLES TO BE PREPARED LIST

SST

Shape	Part No.	Part name
	09208-87701-000	Remover,oil seal
	09608-87302-000	Tool set,axle hub bearing & drive pinion bearing

#### Tool

Soldering iron

#### Instrument

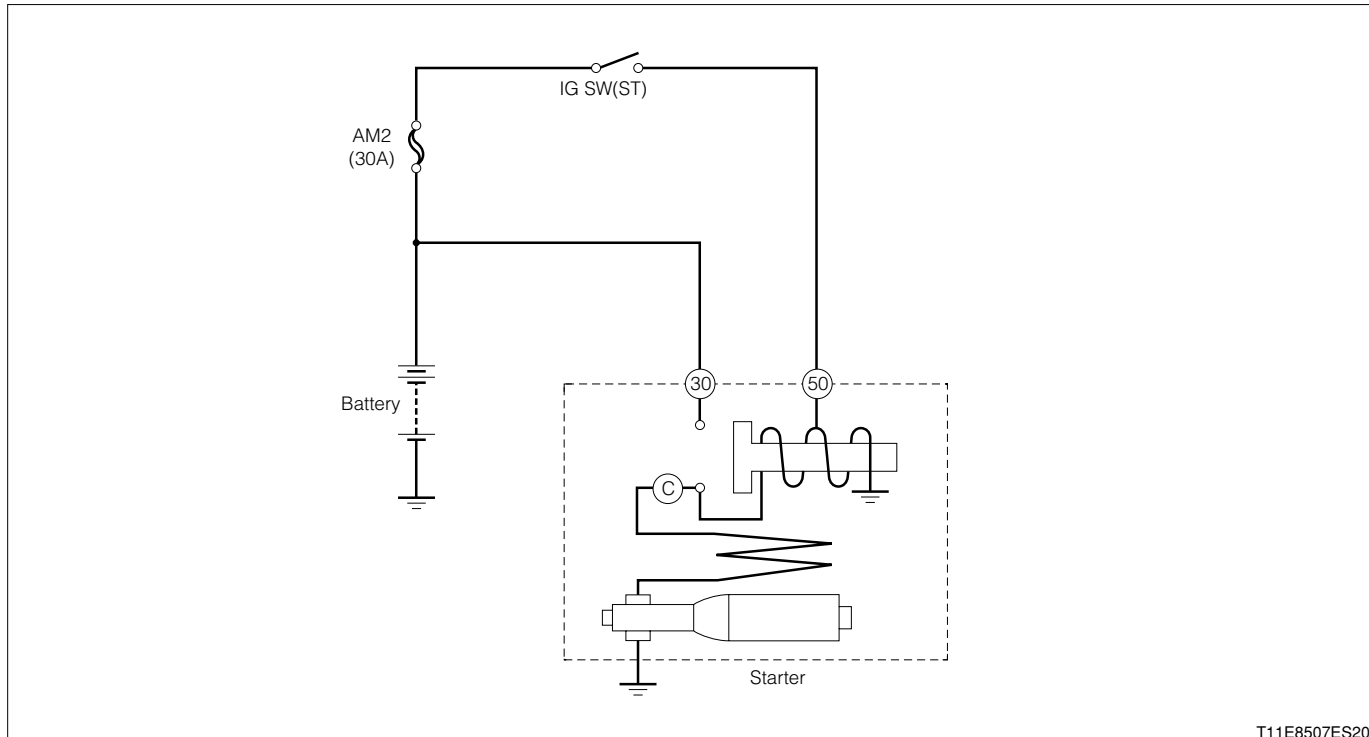
Torque wrench, Spring separates, Dial gauge, Vernier calipers, Voltage tester, V-shaped blocks

#### Lubricant, adhesive, others

High-temperature grease

## 2 STARTER

### 2-1 CIRCUIT DIAGRAM



T11E8507ES20

#### Starter performance

Rated output (kW)	0.7	1
Non-loaded characteristics	50 A or less [at time of 11.5 V] 6000 rpm or more	90 A or less [at time of 11.5 V] 3000 rpm or more
Number of pinion teeth	9	9
Rotating direction	Clockwise as viewed from pinion side	Clockwise as viewed from pinion side
Weight (kg)	3.25	3.15

## 2-2 UNIT CHECK

### CAUTION

- Each check should be performed within a short length of time (3-5 seconds).

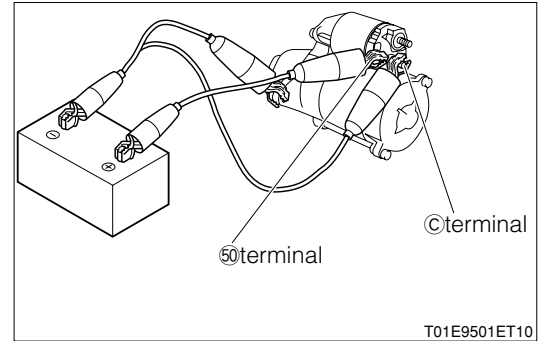
### 2-2-1 CHECK

#### (1) Pull-in check

1. Apply the battery voltage to the terminal ⑤. Connect the earth wire to the terminal ③ and the starter body. Ensure that the pinion gear jumps out.

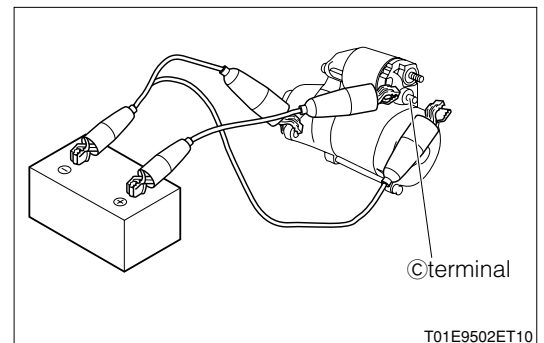
### CAUTION

- This test should be carried out with the lead wire of the magnet switch disconnected.



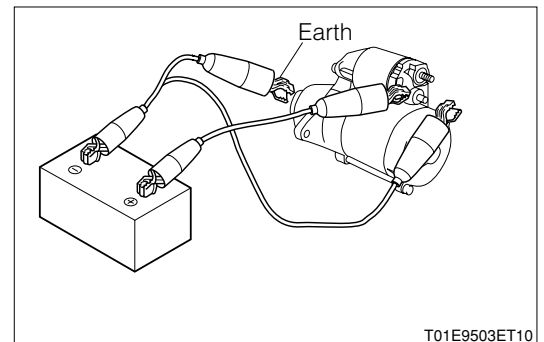
#### (2) Retention check of holding coil

1. Under the pull-in check state, disconnect the wire leading to the terminal ③. Ensure that the pinion gear remains in the jump-out state.



#### (3) Plunger return check

1. Under the retention check state of the holding coil, disconnect the earth wire from the starter body. Ensure that the pinion gear returns.



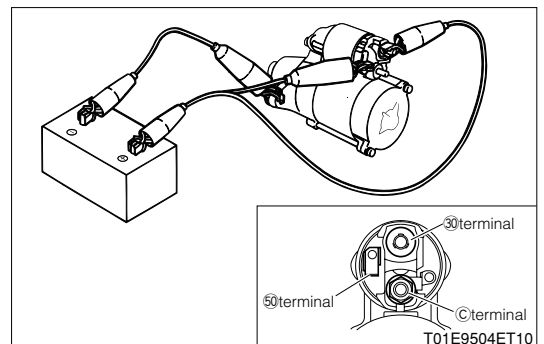
#### (4) No-load test

1. Clamp the starter in a vice, etc.
2. Hook up the cables and tester, as indicated in the figure. (At this time, do not connect a wire to the terminal ⑤.)
3. Connect the terminal ⑤. When the ammeter reading has stabilized, take the reading of the ammeter.

**SPECIFIED VALUE:** 0.7 kW type: 50 A or less at 11.5 V  
1.0 W type: 90 A or less at 11.5 V

### CAUTION

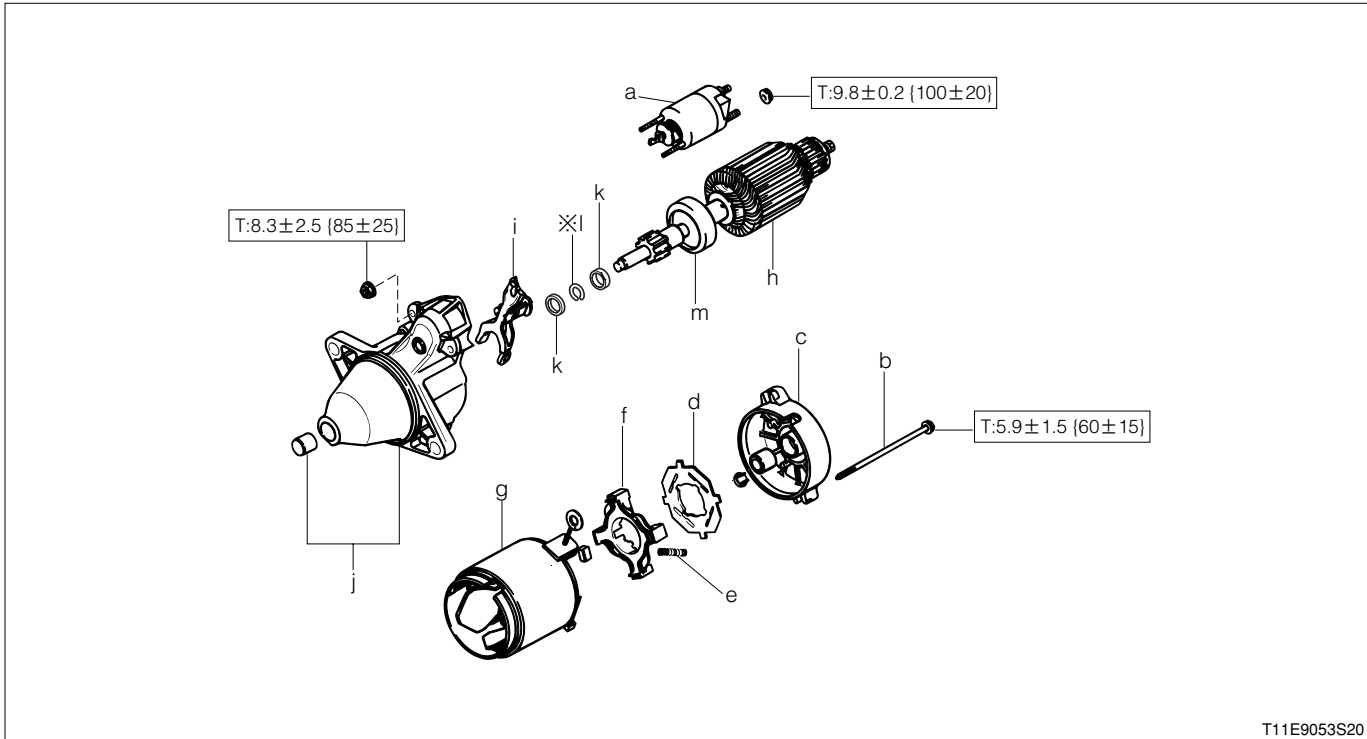
- A large current will flow during the test. Hence, be certain to employ a heavy lead wire.



## 2-3 DISASSEMBLING AND ASSEMBLING

### 2-3-1 DISASSEMBLING AND ASSEMBLING PROCEDURE(0.7 KW TYPE)

#### (1) Components



Unit: N·m{kgf·cm}

※: Non-reusable parts

#### (2) Disassembling and assembling procedure

- |                                      |                                 |
|--------------------------------------|---------------------------------|
| 1 a Switch Ay, magnet                | 8 h Armature Ay, starter        |
| 2 b Bolt, through                    | 9 i Lever, starter drive pinion |
| 3 c frame Ay, starter commutator end | 10 j Housing Ay, starter drive  |
| 4 d Insulator                        | 11 k Nut, pinion stop           |
| 5 e Brush, spring                    | 12 l Ring, snap                 |
| 6 f Brush, holder                    | 13 m Clutch S/A, starter        |
| 7 g York Ay, starter                 |                                 |

#### 2-3-2 POINTS OF DISASSEMBLY

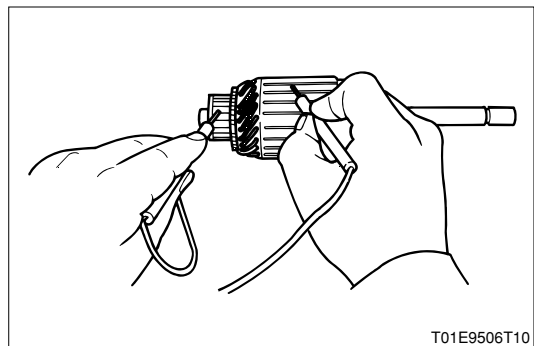
1. Remove the parts in the sequence of the Components diagram.

#### 2-3-3 CHECK

##### (1) Check of armature coil

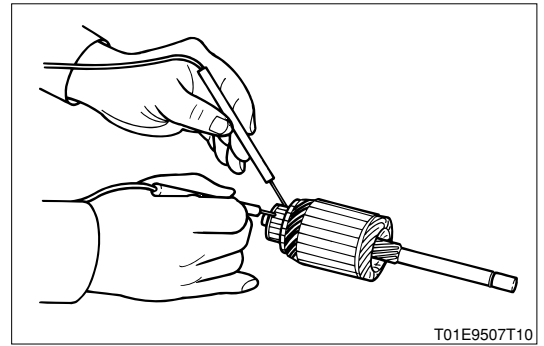
1. Check the insulation between the commutator and armature coil core.

SPECIFIED VALUE: No continuity exists



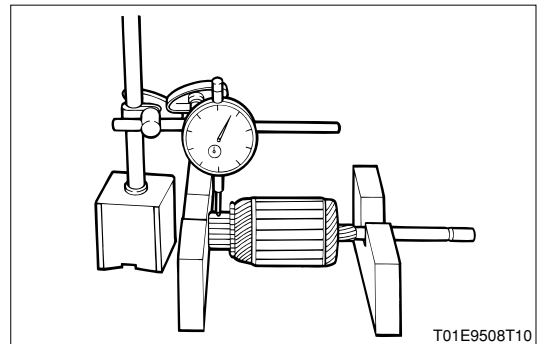
2. Check continuity between segments.

SPECIFIED VALUE: Continuity should exist between each segment.



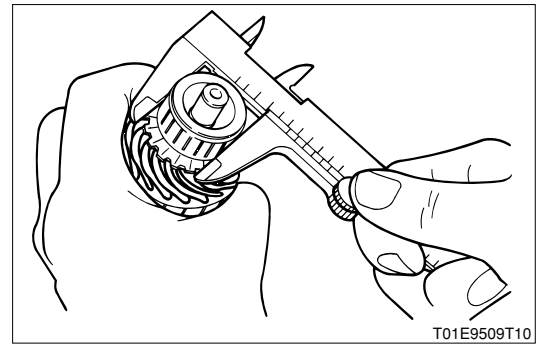
3. Check the run-out of the commutator.

ALLOWABLE LIMIT: 0.4 mm



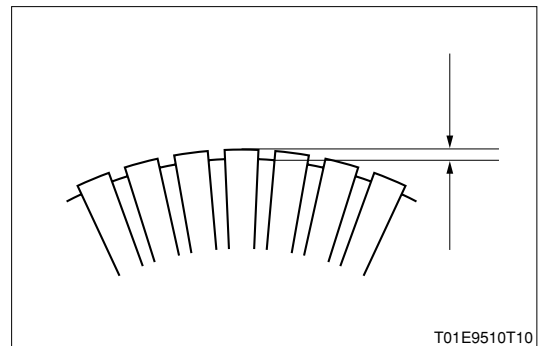
4. Measure the outer diameter of the commutator.

SPECIFIED VALUE: 28 mm  
ALLOWABLE LIMIT: 27 mm



5. Check the under-cut depth of each segment.

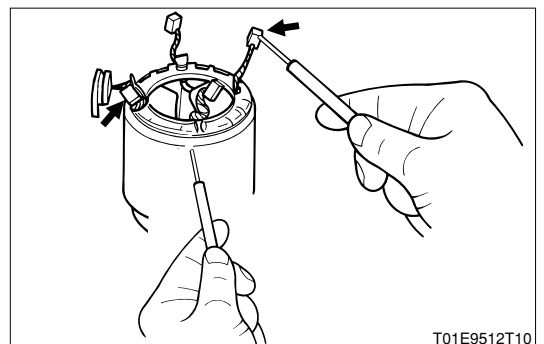
SPECIFIED VALUE:  $0.60 \pm 0.15$  mm  
ALLOWABLE LIMIT: 0.2 mm



**(2) Field coil check**

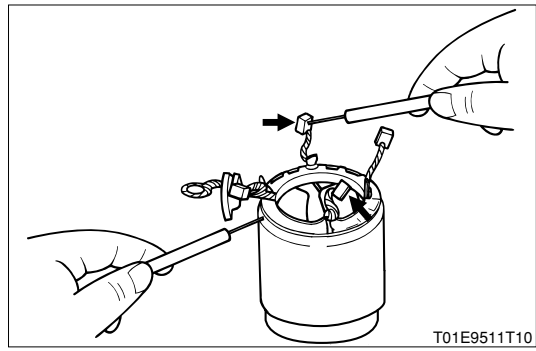
1. Check the insulation between the yoke and the terminal C lead wire side brush.

SPECIFIED VALUE: No continuity exists



2. Check the continuity between the yoke and the field coil side brush.

SPECIFIED VALUE: Continuity exists



### (3) Check of brush

1. Check the roughness of the contact surface and brush length.

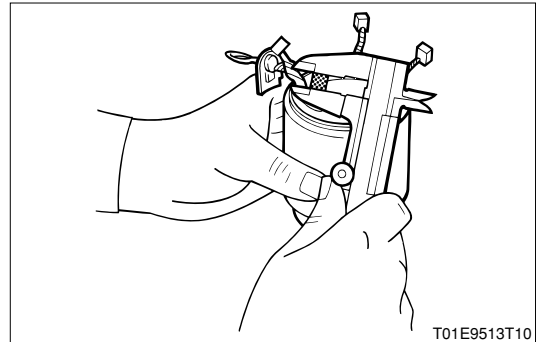
SPECIFIED VALUE: 10.0 mm

ALLOWABLE LIMIT: 6.0 mm

#### CAUTION

- The measurement of brush length should be conducted at the center recessed section.

2. When the contact surface is corrected or replaced, wrap an abrasive paper (400#) around the commutator and remedy the contact surface.

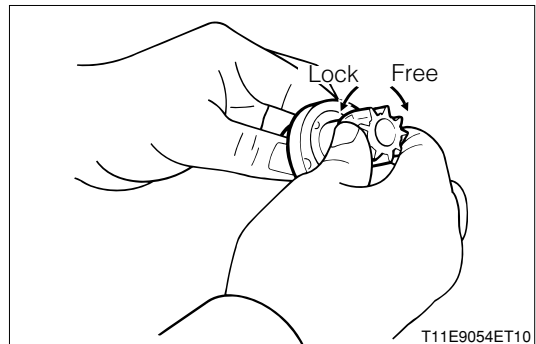


### (4) Check of spring

1. Visually inspection for spring.

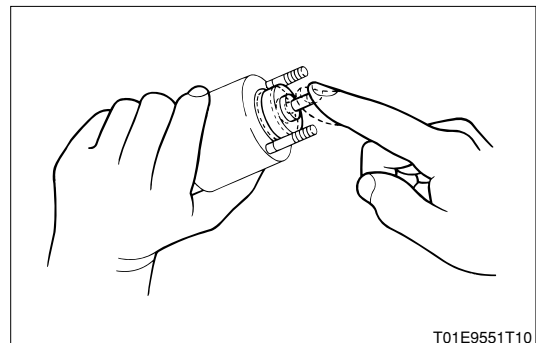
### (5) Check of starter clutch

1. Check the gear for wear and damage.  
 2. Ensure that the gear locks when the gear is turned in the left turning direction (the counterclockwise direction). Furthermore, ensure that the gear turns smoothly when the gear is turned in the right turning direction (the clockwise direction).



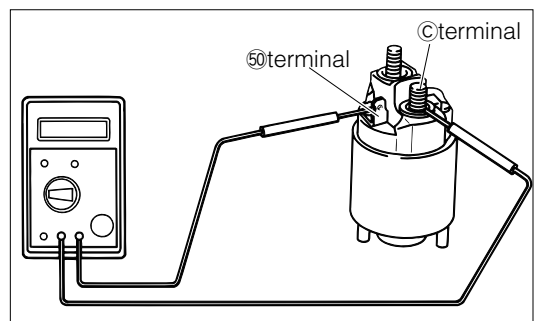
### (6) Magnet clutch check

1. When the plunger is pushed in and released, ensure that the plunger returns quickly to the original position.

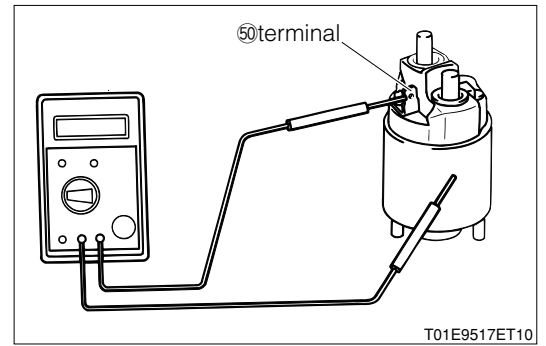


2. Check continuity between the terminal ⑤ and the terminal ③.

SPECIFIED VALUE: Continuity exists.

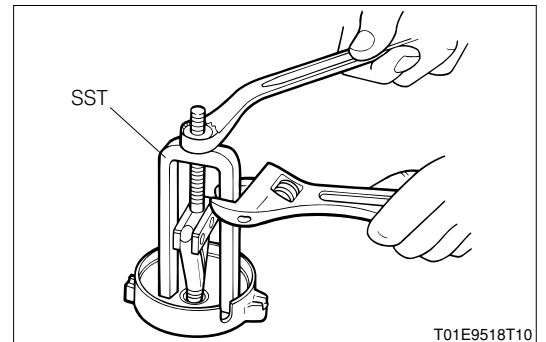


3. Check continuity between the terminal ⑤ and the magnet switch body.  
SPECIFIED VALUE: Continuity exists.

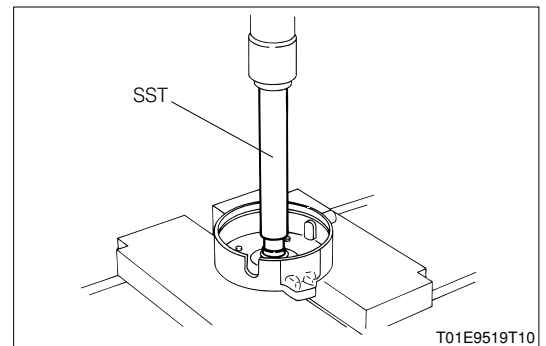


**(7) Bush replacement**

1. Remove the bush, using the SST.  
SST: 09208-87701-000



2. Press the bush, using the SST in combination with a press.  
SST: 09608-87302-000



**2-3-4 POINTS OF ASSEMBLY**

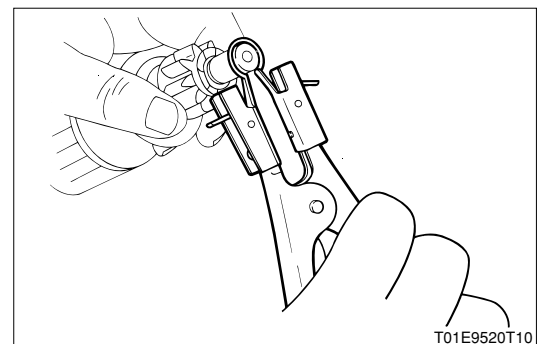
**(1) Clutch S/A, starter**

1. Apply the high-temperature grease to the inner bearing sections of the starter clutch S/A, shaft spindle, spline contact section, pinion stop nut and snap ring.  
LUBRICANT: High-temperature grease

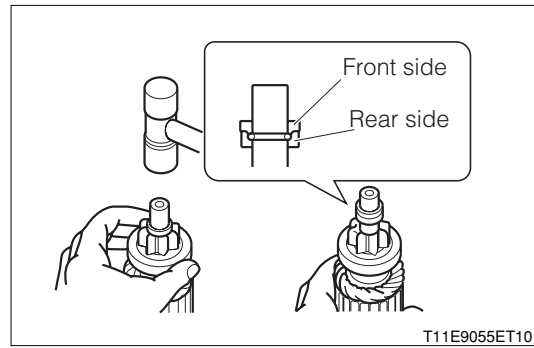
2. Pass the pinion stop nut at the rear side of the starter clutch S/A to the shaft of the starter armature.

**(2) Ring, snap**

1. Fit the snap ring into the shaft groove section of the starter armature, using circlip pliers or the like.



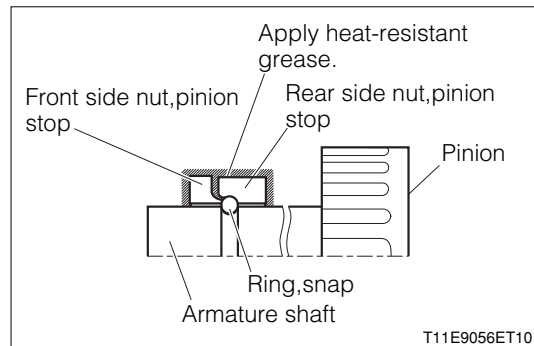
2. While holding the outer periphery of the clutch S/A, lightly tap the forward edge of the rear side shaft of the starter armature, using a plastic hammer so that the snap ring may be fitted into the inner groove of the pinion stop nut.



3. Pass the pinion stop nut at the front side to the starter armature.

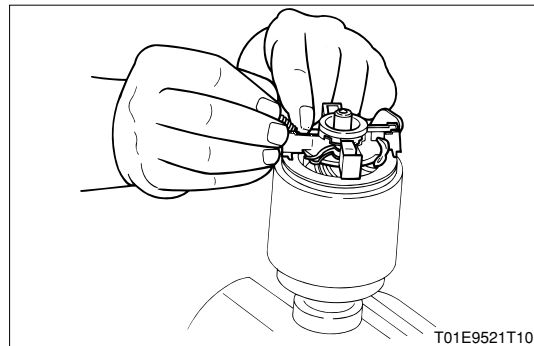
**CAUTION**

- Install the pinion stop nut to the shaft section of the starter armature, while confirming the correct direction of the pinion stop nut.  
(If the pinion stop nut should be installed in the opposite direction, it would cause abnormal noise.)



**(3) Brush, holder**

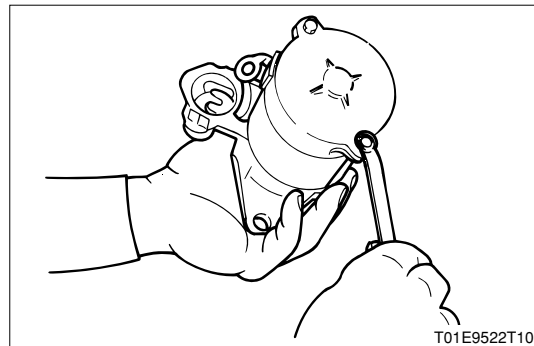
1. Set the spring brush to the brush holder. Then, assemble the insulator.



**(4) Frame Ay, commutator end**

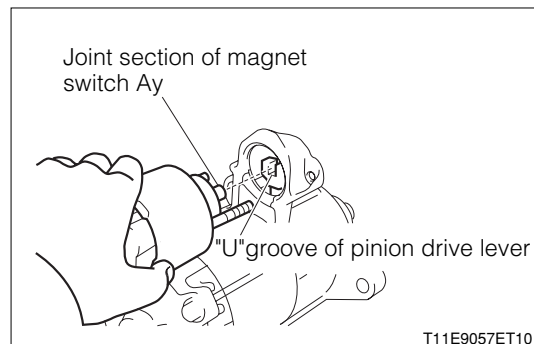
1. Set the starter drive housing Ay, pinion drive lever, starter armature, starter yoke Ay and frame Ay. Assemble them by means of the through bolts.

TIGHTENING TORQUE:  $5.9 \pm 1.5 \text{ N} \cdot \text{m}$  {  $60 \pm 15 \text{ kgf} \cdot \text{cm}$  }



**(5) Switch Ay, magnet**

1. The installation should be made firmly with the joint section of the switch Ay fitted into the "U"groove of the pinion drive lever.

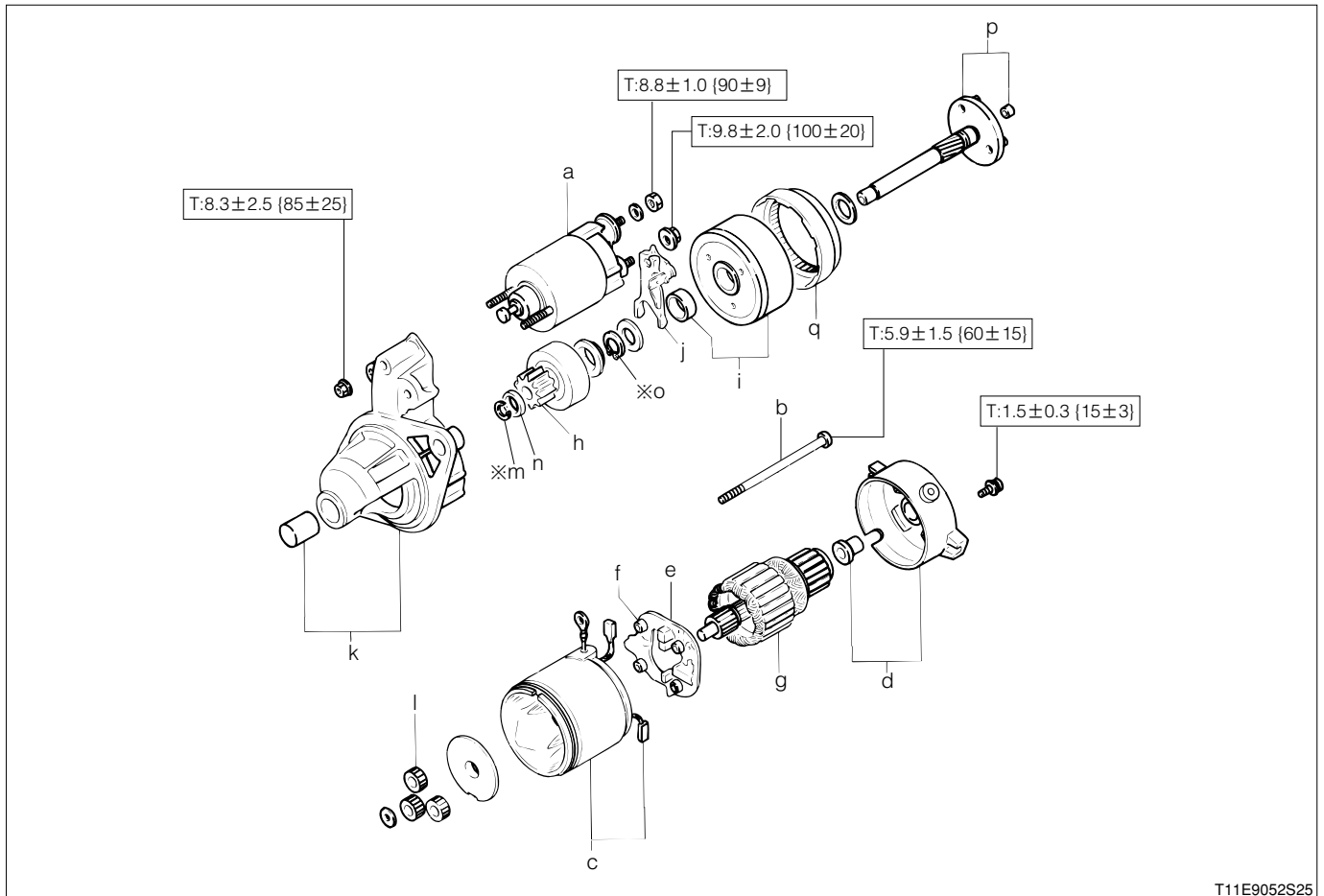




## 2-4 DISASSEMBLING AND ASSEMBLING

### 2-4-1 DISASSEMBLING AND ASSEMBLING PROCEDURE(1.0 KW TYPE)

#### (1) Components



T11E9052S25

Unit: N·m{kgf·cm}

※: Non-reusable parts

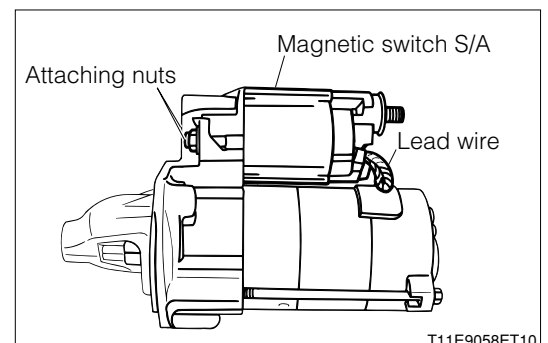
#### (2) Disassembling and assembling procedure

- |                               |                                |
|-------------------------------|--------------------------------|
| 1 a Switch S/A, magnet        | 10 j Lever, pinion drive       |
| 2 b Bolts, through            | 11 k Housing Ay, starter drive |
| 3 c Yoke Ay, starter          | 12 l Gear, starter planetary   |
| 4 d Frame S/A, commutator end | 13 m Ring, snap                |
| 5 e Holder S/A, starter brush | 14 n Nut, pinion stop          |
| 6 f Spring, starter brush     | 15 o Ring, snap                |
| 7 g Armature Ay, starter      | 16 p Shaft S/A, starter planet |
| 8 h Clutch S/A, starter       | 17 q Gear, starter internal    |
| 9 i Bearing S/A, center       |                                |

#### 2-4-2 POINTS OF DISASSEMBLY

##### (1) Switch S/A, magnet

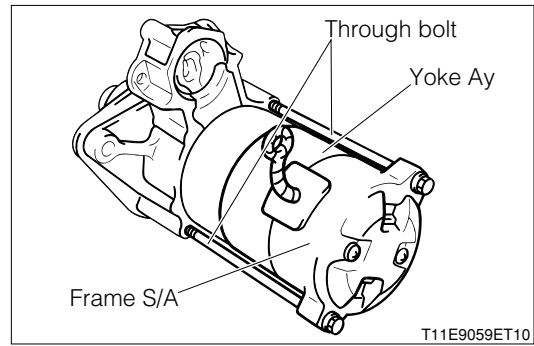
1. Remove the switch S/A.



T11E9058ET10

## (2) Yoke Ay, starter

1. Remove the two through bolts. Remove the yoke Ay and commutator end frame S/A as a set.

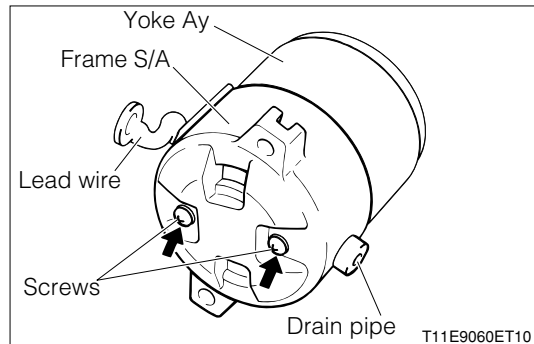


## (3) Frame S/A, commutator end

1. Remove the frame S/A.

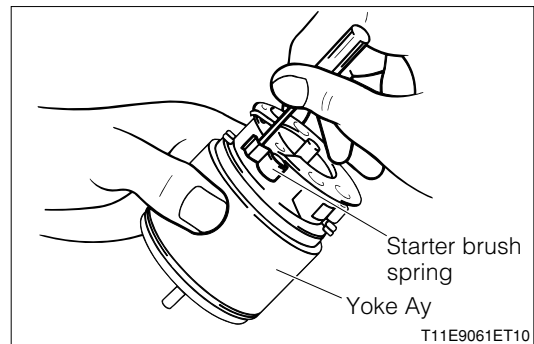
### CAUTION

- Remove the frame S/A in a tilted way. This is necessary because the starter holder S/A and the water drain cover interfere each other inside.
- Remove the lead wire while pushing it toward the yoke Ay side so that it may not be pulled by the frame S/A.



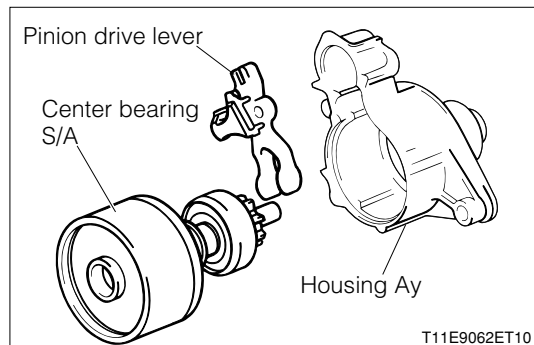
## (4) Holder S/A, starter

1. Remove the holder S/A with the following procedure.
  - (1) Lift the starter brush spring and remove the starter brush.
  - (2) Remove the holder S/A from the starter yoke Ay.



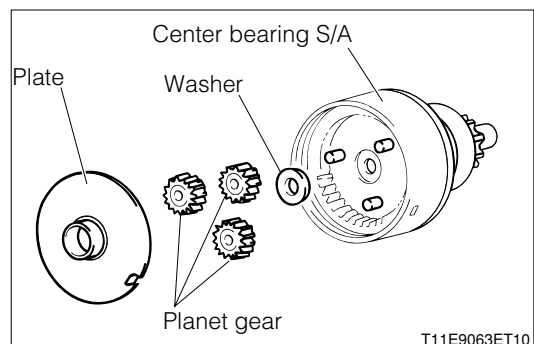
## (5) Housing Ay, starter drive

1. Remove the starter armature Ay and the starter clutch S/A.
2. Disassemble the center bearing S/A, pinion drive lever and housing Ay as shown in the right figure.



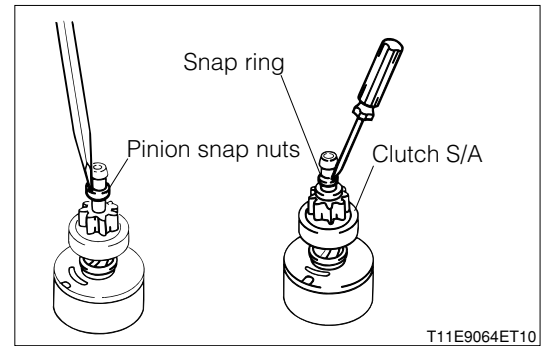
## (6) Gear, starter planetary

1. Remove the plate as shown in the right figure and remove the gear (three gears).



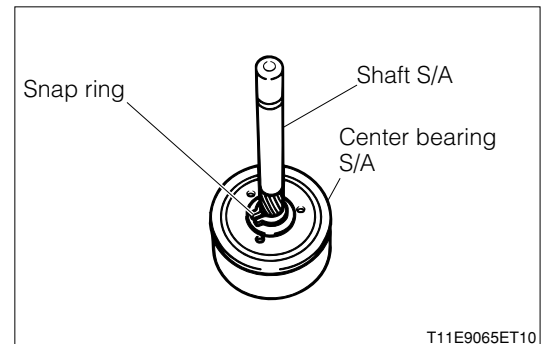
## (7) Ring, snap

- As shown in the right figure, remove the snap ring and pinion stop nut so as to separate the starter clutch S/A.



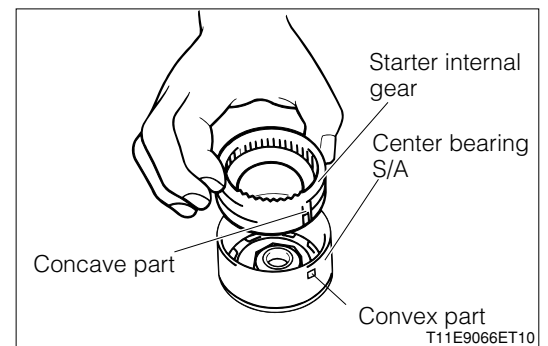
## (8) Shaft S/A, starter planetary

- Remove the snap ring and disassemble the center bearing S/A and shaft S/A.



## (9) Gear S/A, starter internal

- Disassemble the gear with the recessed section at the gear outer periphery aligned with the projected section at the inner periphery of the center bearing S/A.

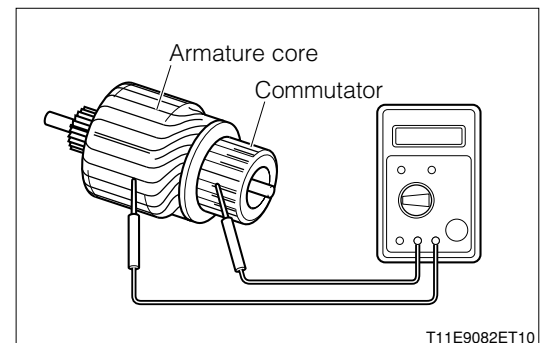


## 2-4-3 CHECK

### (1) Check of starter armature Ay

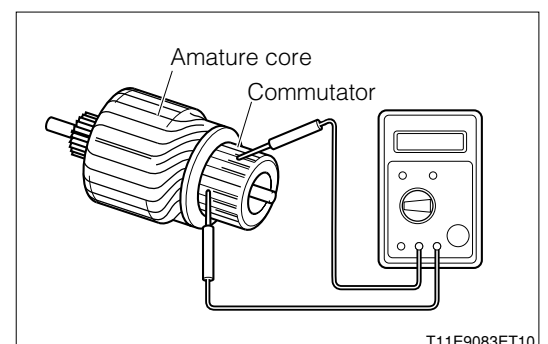
- Check the insulation between the commutator and the armature core.

SPECIFIED VALUE: No continuity exists



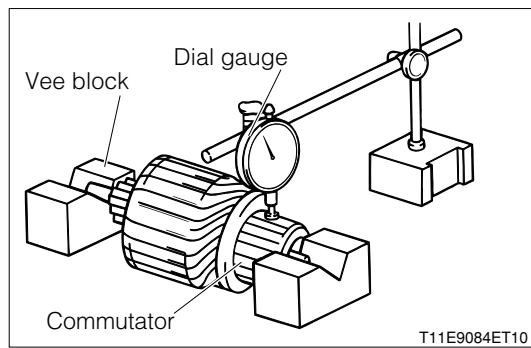
- Check the continuity between segments.

SPECIFIED VALUE: Continuity should exist between the segments.



3. Check the commutator for runout.

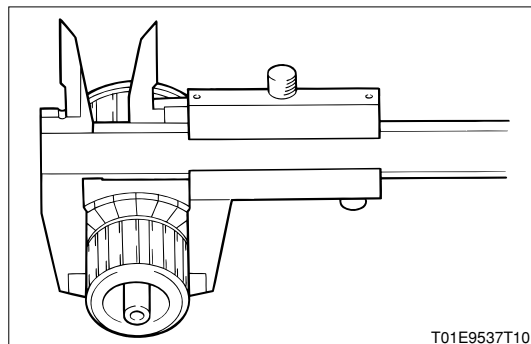
ALLOWABLE LIMIT: 0.05 mm



4. Measure the outer diameter of the commutator.

SPECIFIED VALUE: 28.0 mm

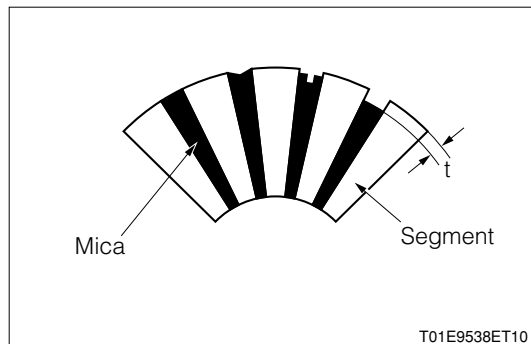
ALLOWABLE LIMIT: 27.0 mm



5. Check the under-cut depth of each segment.

SPECIFIED VALUE:  $0.60 \pm 0.15$  mm

ALLOWABLE LIMIT: 0.2 mm

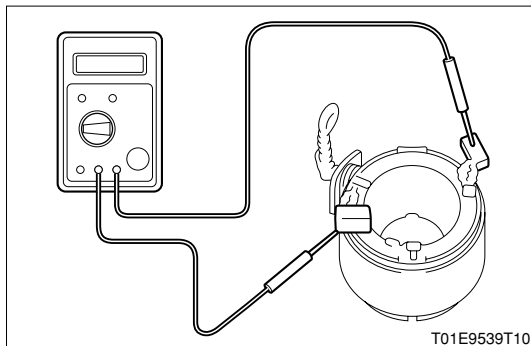


## (2) Check of starter yoke Ay

1. Check of field coil

(1) Confirm continuity between the brushes.

SPECIFIED VALUE: Continuity exists

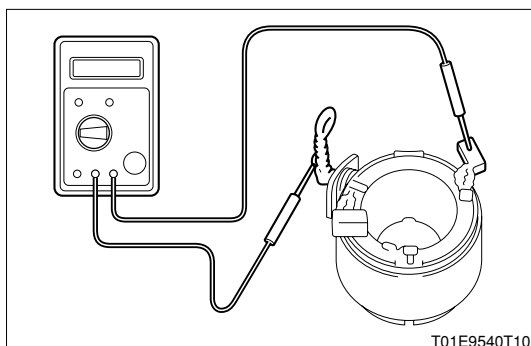


(2) Check continuity between the brush and the C terminal lead wire.

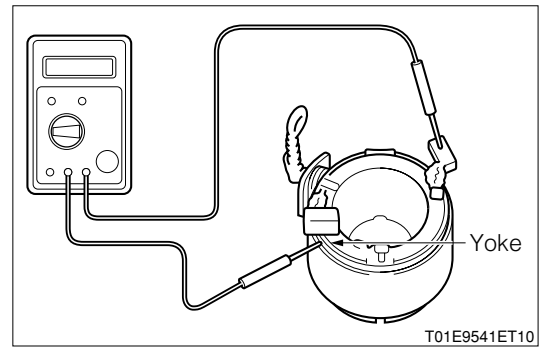
SPECIFIED VALUE: Continuity exists

### CAUTION

- Check the both brush.



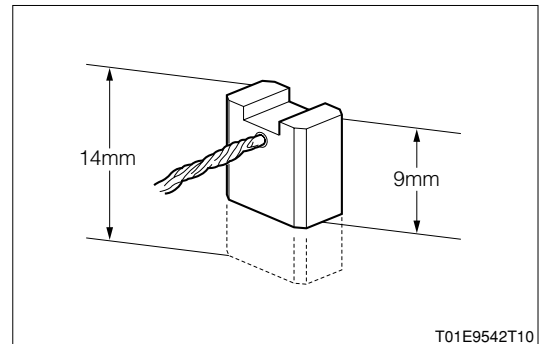
(3) Check the insulation between the brush and yoke.  
 SPECIFIED VALUE: No continuity exists



2. Check of brush

(1) Check the roughness of the contact surface and brush length.

ALLOWABLE LIMIT: 9 mm

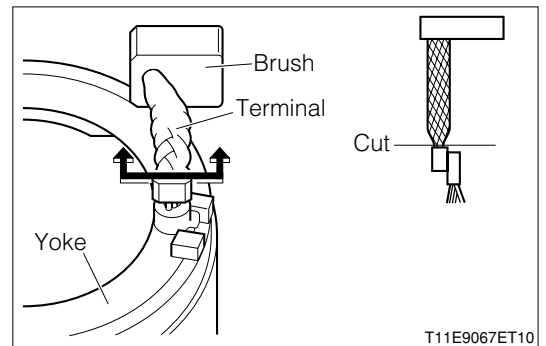


**(3) Brush replacement procedure**

1. Cut the brush lead wire at the terminal side.

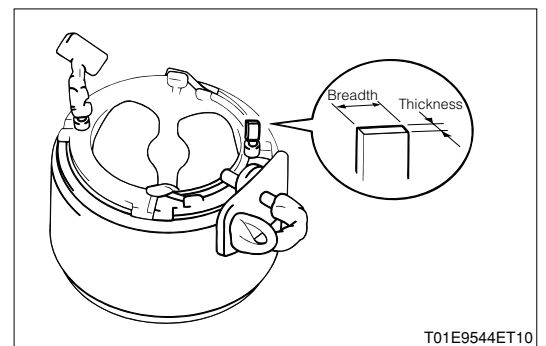
**CAUTION**

- It is possible to replace the two brushes only at the yoke side (⊕ side). As for the ⊖ side brush, however, the replacement can be made only by the brush holder unit.



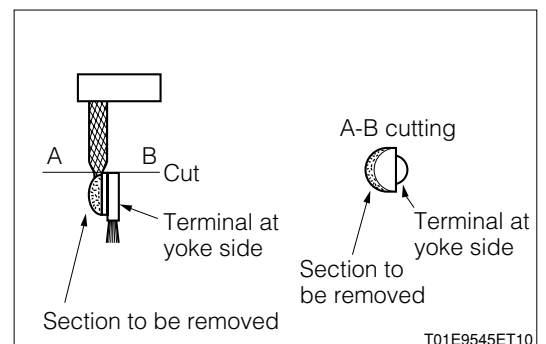
2. Grind the welding trace of the brush terminal by means of a file, etc. so that the terminal may be remedied to the specified dimensions.

SPECIFIED VALUE: Thickness  $1.4 \pm 0.1$  mm  
 Breadth 5 mm



**CAUTION**

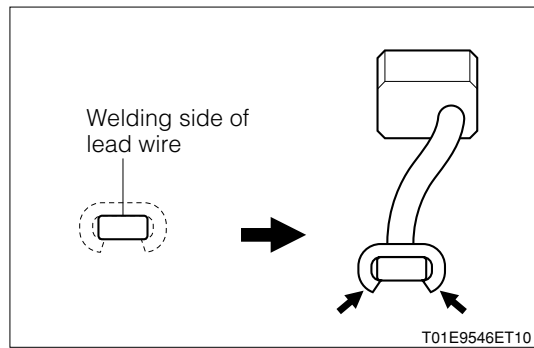
- Grind the area of the brush holder unit. as indicated in the right figure. Since the section to be ground is very narrow, care must be exercised not to scratch the field coil.



3.Overlap the plate section of the replacement brush onto the lead wire fusing side and press-fit the section with pliers.

**CAUTION**

- Make sure not to make a mistake concerning the removal direction of the brush lead wire.

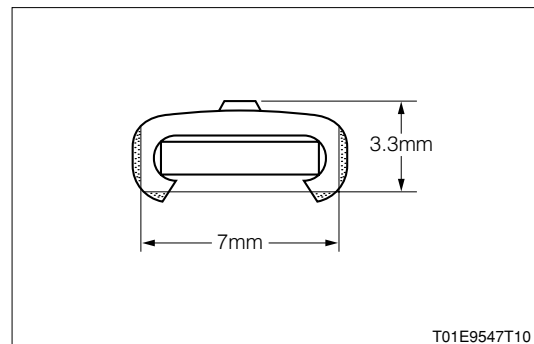


4.Solder the press-fitting section. Grind the area with a file or the like so as to attain the specified dimensions as indicated in the right figure.

TOOL: Soldering iron

**CAUTION**

- When performing the soldering, thoroughly heat the section to be soldered so that no solder may flow to the positive side lead wire.
- Make sure that the solder flows thoroughly to the inside of the plate.
- Ensure that the solder may not drip onto the field side.

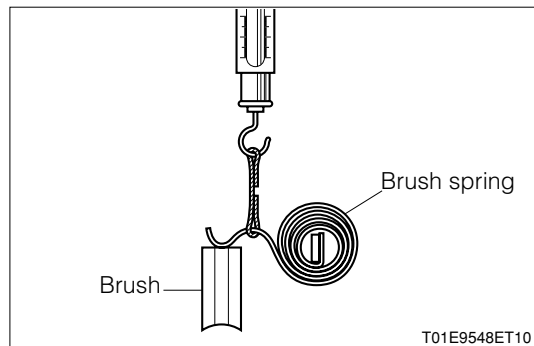


**(4) Check of brush spring load**

1.Using a spring scale, observe the reading at the moment when the spring separates from the brush.

SPECIFIED VALUE:  $15.7 \pm 2.0 \text{ N} \cdot \text{m}$  { $160 \pm 20 \text{ kgf} \cdot \text{cm}$ }

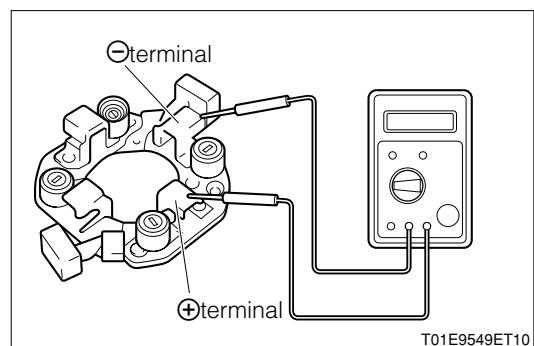
ALLOWABLE LIMIT:  $8.8 \text{ N} \cdot \text{m}$  { $90 \text{ kgf} \cdot \text{cm}$ }



**(5) Check of brush holder.**

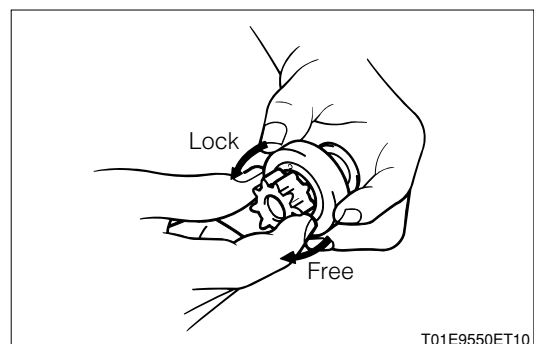
1.Conduct an insulation check between the brush holder at the ⊕ side and the brush holder at the ⊖ side.

SPECIFIED VALUE: No continuity exists



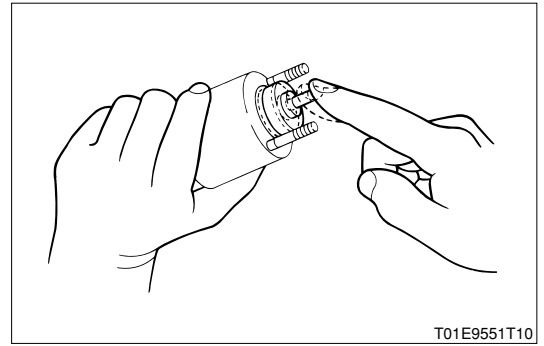
**(6) Check of clutch**

- 1.Check the gear for wear and damage.
- 2.Ensure that the gear locks when the gear is turned in the left turning direction (the counterclockwise direction). Furthermore, ensure that the gear turns smoothly when the gear is turned in the right turning direction (the clockwise direction).



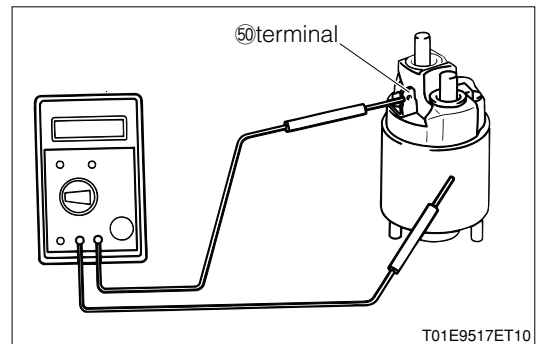
## (7) Check of magnet switch

1. When the plunger is pushed in and released, ensure that the plunger returns quickly to the original position.



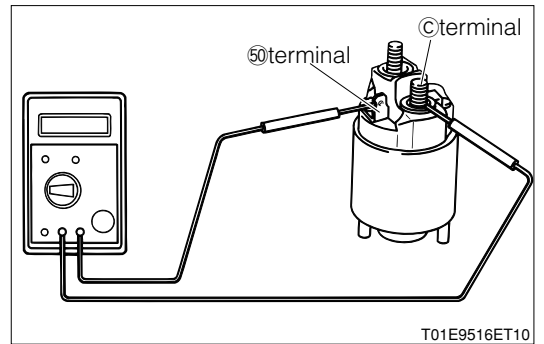
2. Check continuity between the terminal ⑤ and the magnet switch body.

SPECIFIED VALUE: Continuity exists



3. Check continuity between the terminal ⑤ and the terminal ③.

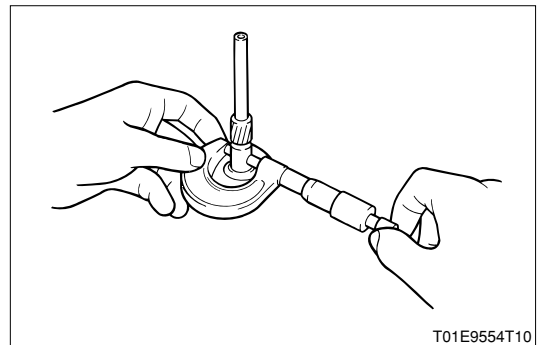
SPECIFIED VALUE: Continuity exists



## (8) Check of planetary carrier shaft

1. Measure the outer diameter of the center bearing sliding section of the planet carrier shaft.

SPECIFIED VALUE: 15 mm



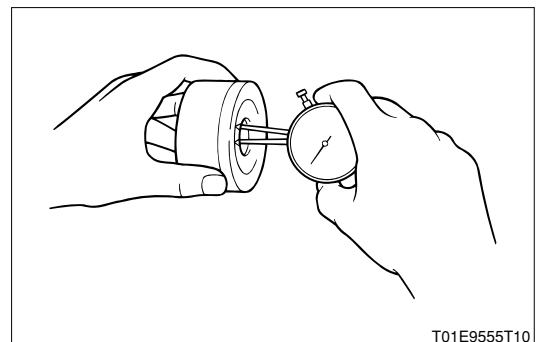
## (9) Bearing S/A bearing clearance check

1. Measure the inner diameter of the bearing S/A. Determine the clearance from the outer diameter of the planet carrier shaft obtained.

If the clearance exceeds the allowable limit, replace the oilless bearing or the planet carrier shaft, as required.

SPECIFIED VALUE: 0.03 mm

ALLOWABLE LIMIT: 0.10 mm



## 2.Replacement of bearing.

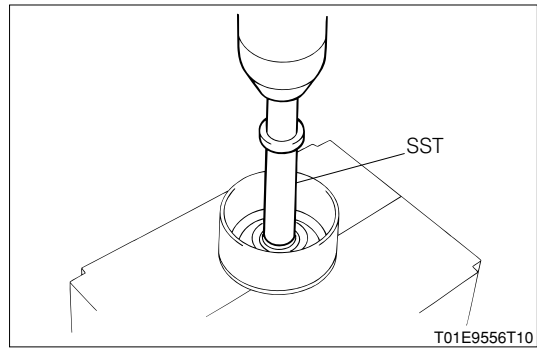
- (1) Remove the bearing, using the SST in combination with a press, etc.

### CAUTION

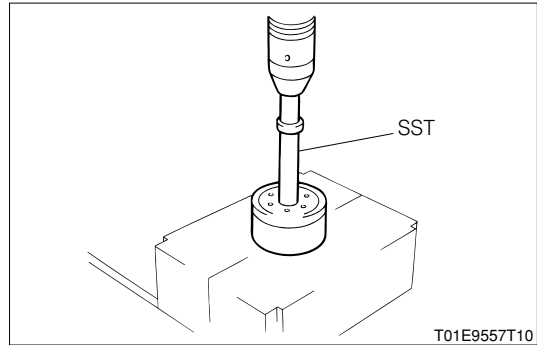
- When removing the bearing, be sure to remove it, starting from the inside, as indicated in the right figure.

### NOTE

- The SST is handled by Denso. "95208 – 10090"



- (2) Install a new bearing, using the SST in combination with a press, etc.

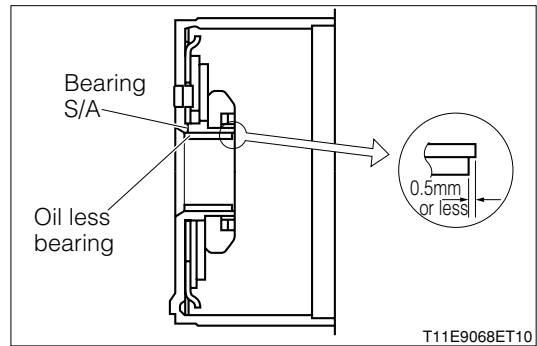


### NOTE

- The SST is handled by Denso. "95208 – 10090"

### CAUTION

- When installing the bearing, be sure to install it starting from the outside.
- Drive the bearing into place in such a way that the bearing is 0.5 mm or less in relation to the edge of the center bearing.

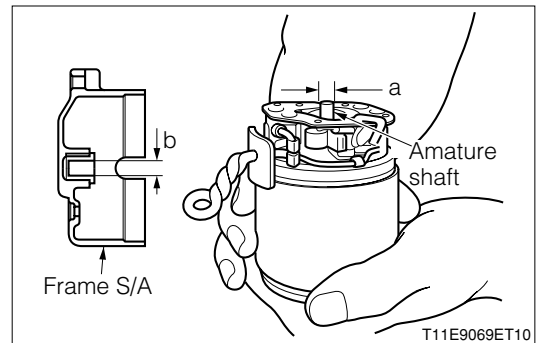


## (10) Frame S/A bearing clearance check

1. In the same way as with the bearing S/A bearing clearance, measure the outer diameter  $a$  of the armature shaft frame S/A bearing section and the inner diameter  $b$  of the frame S/A so as to calculate the clearance. If the limit is exceeded, replace one of these components.

**SPECIFIED VALUE:**  $a:0.035$  mm

**ALLOWABLE LIMIT:**  $a-b:0.10$  mm

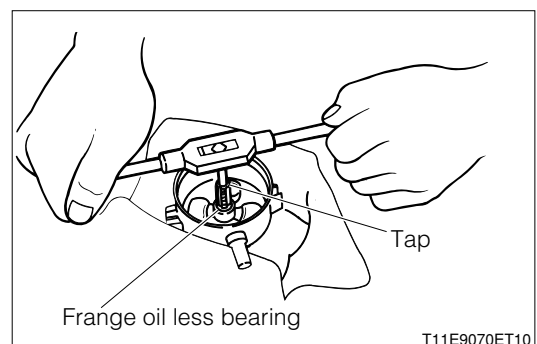


## 2.Replacement of flange oilless bearing.

- (1) Remove the oilless bearing, using a tap, as indicated in the right figure.

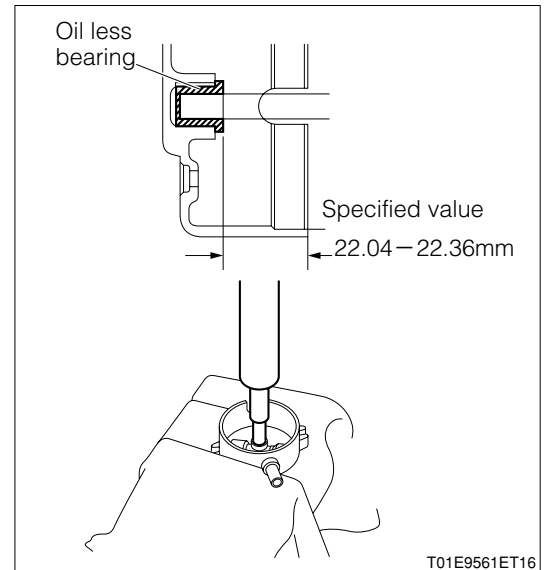
### CAUTION

- When clamping the end frame in a vice, care must be exercised not to deform or damage the fitting section.





(2) Press a new oilless bearing, as indicated in the right figure.

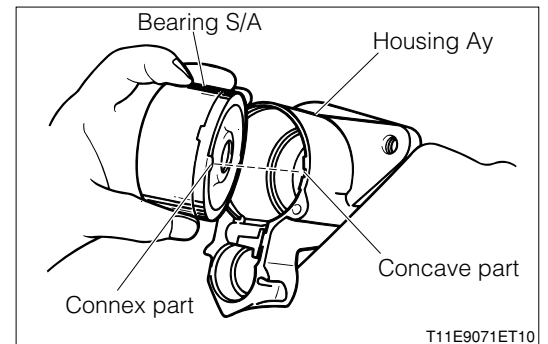


### (11) Check of shock absorber of bearing

1. Clamp the flange section of the housing Ay in a vice. Install the bearing S/A, using the guide mark.

#### CAUTION

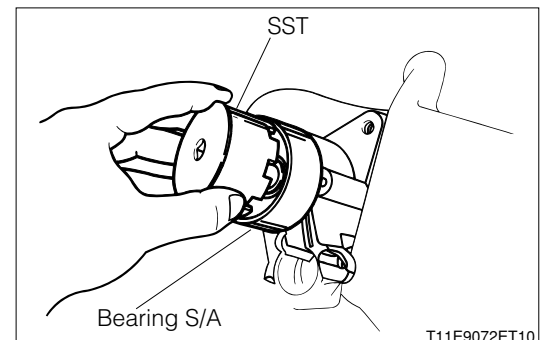
- When clamping the housing Ay in a vice, do not tighten the housing forcibly.
- Assemble the bearing S/A. Confirm that the bearing S/A will not turn.



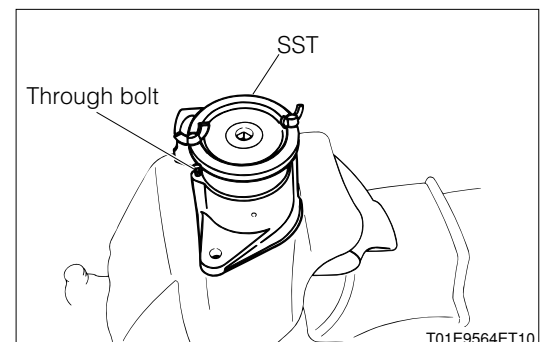
2. Assemble the SST, as indicated in the right figure. Turn the SST slightly so that it may engage with the shock absorber.

#### NOTE

- The SST is handled by Denso. "95208 - 10100"



3. Working from above the bearing S/A, as indicated in the right figure, secure the SST to the through-bolt attaching section of the housing Ay.



4. As indicated in the right figure, using a torque wrench, apply torque through the SST. Observe a sliding torque reading at the moment when the rotation starts.

When the reading is deviated from the allowable limit, the replacement should be made together with the bearing S/A.

**SPECIFIED VALUE:**  $29.4 \pm 3.9 \text{ N} \cdot \text{m}$  { $300 \pm 40 \text{ kgf} \cdot \text{cm}$ }

**ALLOWABLE LIMIT:**  $21.6 \text{ N} \cdot \text{m}$  { $220 \text{ kgf} \cdot \text{cm}$ }

### CAUTION

- Never disassemble or wash the shock absorber section. If it has been disassemble or washed, do not reuse it.

### NOTE

- The SST is handled by Denso. "95208-10100"

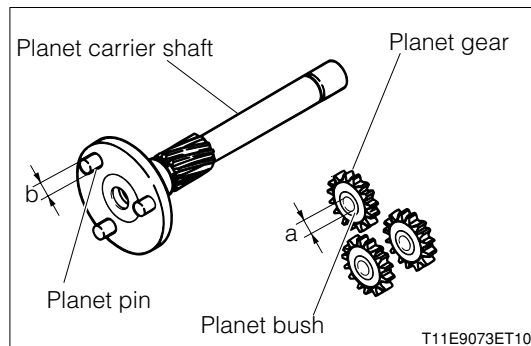
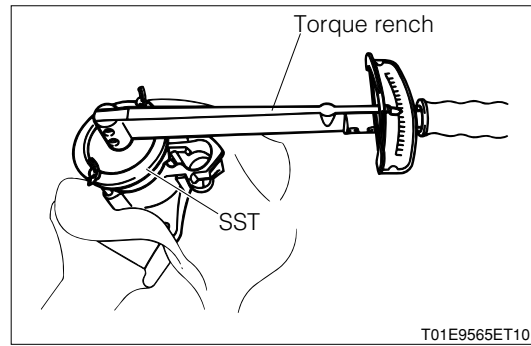
## (12) Check of planetary brush oil clearance.

1. Calculate the clearance, based on the planetary diameter (b) press-fitted to the planetary carrier shaft and the planetary bush inner diameter (a).

If the limit is exceeded, replace the planetary gear or the planetary carrier shaft.

**SPECIFIED VALUE:** 0.03 mm

**SPECIFIED VALUE:** 0.10 mm

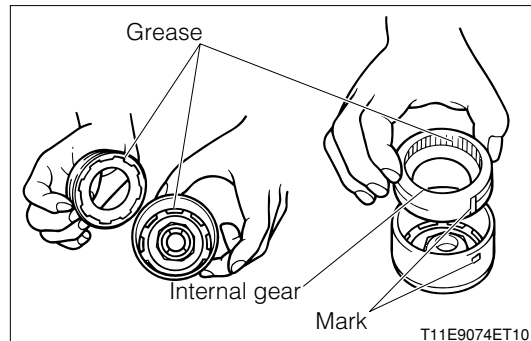


## 2-4-4 POINTS OF ASSEMBLY

### (1) Gear, starter internal

1. Apply high-temperature grease of 2 g or more to the fitting section of the gear and shock absorber as well as to the inner section of the gear, as indicated in the right figure. Perform the assembling with the mating marks aligned.

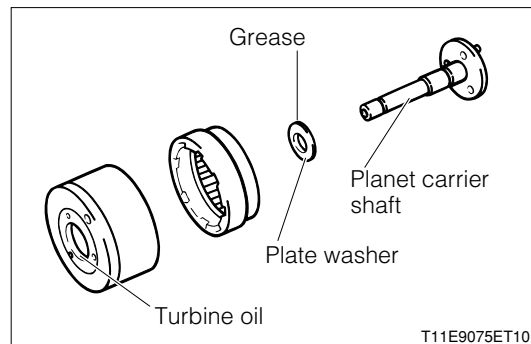
**LUBRICANT:** High-temperature grease



### (2) Shaft S/A, starter planetary

1. Apply turbine oil to the inner periphery of the center bearing S/A. Apply high-temperature grease to the both sides of the plate washer. After installing it to the shaft S/A, install the center bearing S/A.

**LUBRICANT:** High-temperature grease

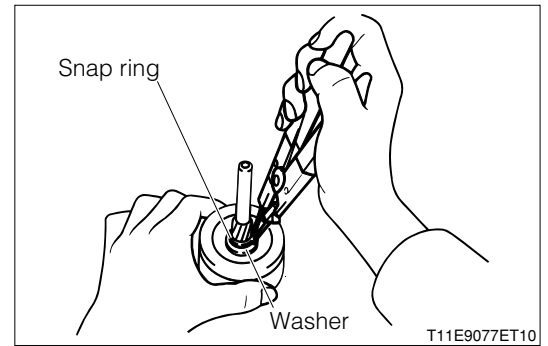


### (3) Ring, snap

1. Install a new ring.

#### CAUTION

- Never reuse the ring.
- Ensure that the plate washer has been installed.



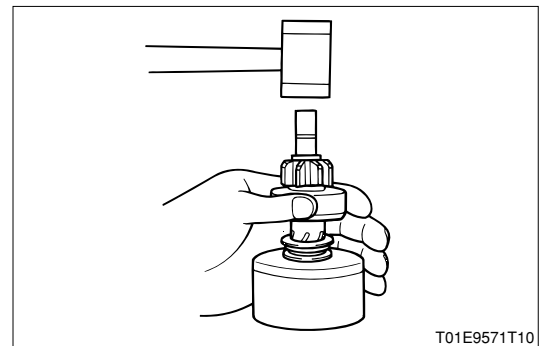
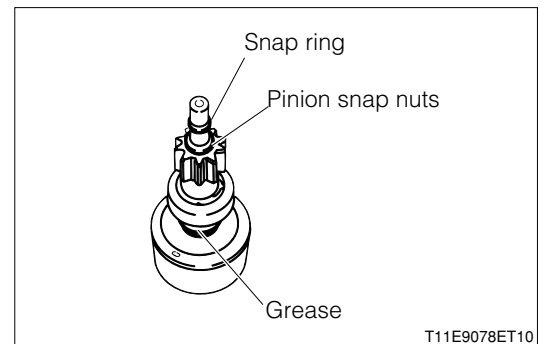
### (4) Clutch S/A, starter

1. Remove the clutch S/A with the following procedure.

- (1) Apply high-temperature grease to the inner periphery bearing section of the starter clutch S/A, shaft spindle, spline contact section, pinion stop nut and snap ring.

**LUBRICANT: High-temperature grease**

- (2) Pass the rear side pinion stop nut of the starter clutch S/A to the shaft S/A.
- (3) Fit the snap ring into the shaft S/A groove section, using circlip pliers or the like.
- (4) While holding the outer periphery of the clutch S/A, lightly tap the starter planet gear, using a plastic hammer so that the snap ring may be fitted into the inner groove of the pinion stop nut.



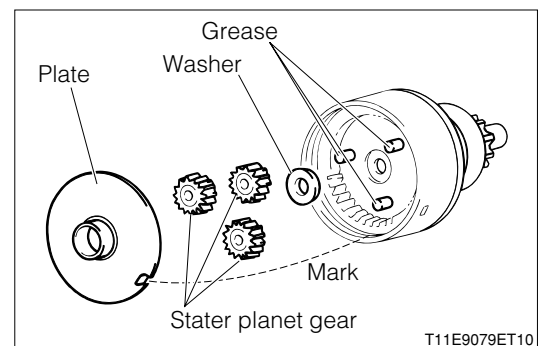
### (5) Gear, starter planetary

1. Apply high-temperature grease of 0.5 g or more, as indicated in the right figure. Install the gears (three pieces) and plate washer.

**LUBRICANT: High-temperature grease**

#### CAUTION

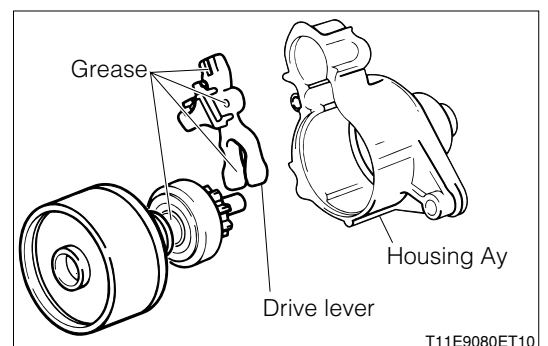
- Install the plate with the mating marks of the center bearing S/A aligned.



### (6) Housing Ay, starter drive

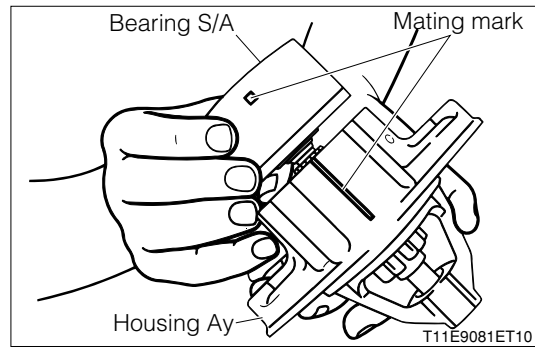
1. Apply high-temperature grease to each contact surface of the pinion drive lever and starter clutch S/A, as indicated in the right figure.

**LUBRICANT: High-temperature grease**



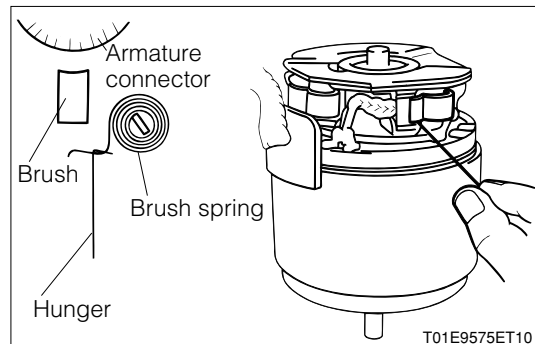
## (7) Bearing S/A, center

1. Install the starter drive housing Ay and bearing S/A with the respective mating marks aligned, as indicated in the right figure.



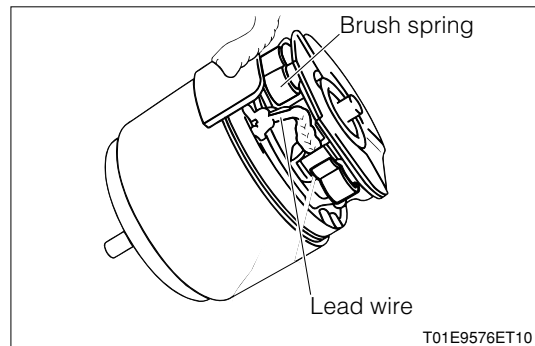
## (8) Holder Ay, starter

1. Install the starter brush spring to the holder S/A. Raise the starter brush spring and install the starter brush to the starter armature Ay.



### CAUTION

- Make sure that the lead wire of the starter brush is not interfering with the brush spring.



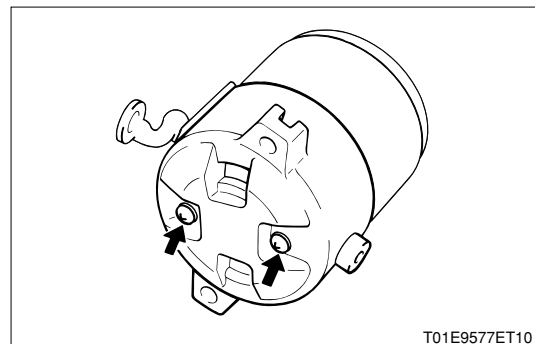
## (9) Frame S/A, commutator end

1. Remove the frame S/A.

### CAUTION

- Install the frame S/A in a tilted way. This is necessary because the starter holder S/A and the water drain cover interfere each other inside.

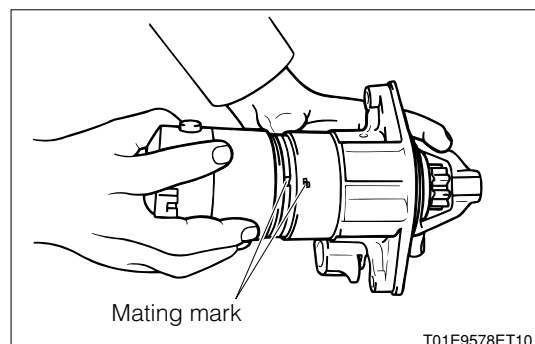
TIGHTENING TORQUE:  $1.5 \pm 0.3 \text{ N} \cdot \text{m} \{15 \pm 3 \text{ kgf} \cdot \text{cm}\}$



## (10) Yoke Ay, starter

1. Perform the installation with the recessed section of the yoke Ay, the projected section of the plate, and the projected section of the center bearing S/A aligned. Afterward, install the through bolt.

TIGHTENING TORQUE:  $5.9 \pm 1.5 \text{ N} \cdot \text{m} \{60 \pm 15 \text{ kgf} \cdot \text{cm}\}$



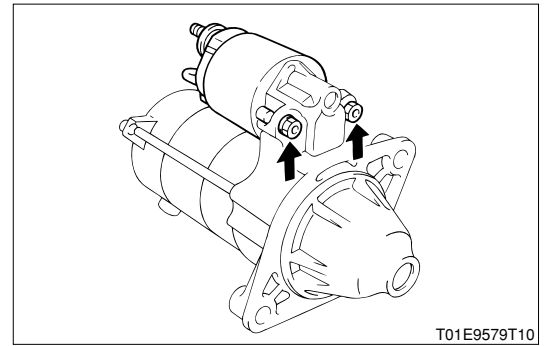
**(11) Switch S/A, magnet**

1. Hang the stud bolt of the switch S/A from the upper side of the pinion drive lever. Install and secure it with the two nuts.

**TIGHTENING TORQUE:**  $8.3 \pm 2.5 \text{ N} \cdot \text{m}$  { $85 \pm 25 \text{ kgf} \cdot \text{cm}$ }

2. Furthermore, install the terminal C of the switch S/A and lead wire.

**TIGHTENING TORQUE:**  $9.8 \pm 2.0 \text{ N} \cdot \text{m}$  { $100 \pm 20 \text{ kgf} \cdot \text{cm}$ }



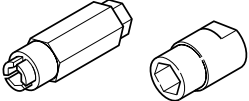
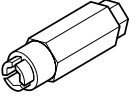
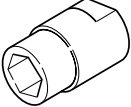
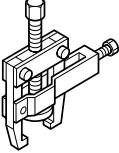
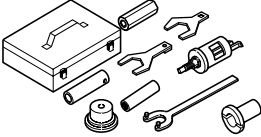
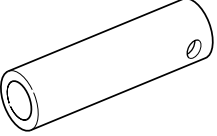
T01E9579T10

## 3 ALTERNATOR

### 3-1 DISASSEMBLING AND ASSEMBLING

#### 3-1-1 ARTICLES TO BE PREPARED

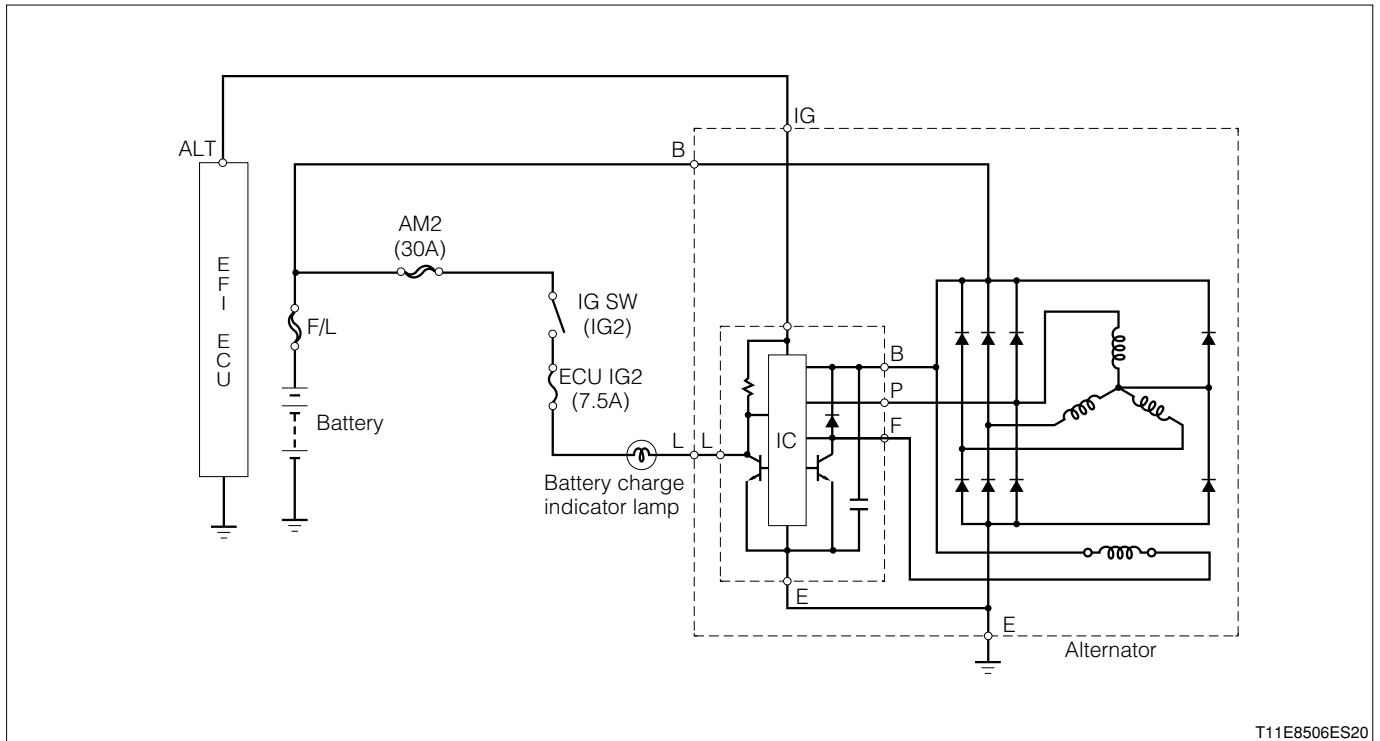
SST

Shape	Part No.	Part name
	09820-87201-000	Wrench set,alternator pulley set nut
	09820-06010-000	Wrench alternator rotor shaft
	09820-87202-000	Wrench alternator pulley set nut
	09820-00021-000	Puller,alternator bearing
	09612-87180-000	Tool set,steering gear housing overhaul
	09612-10061-000	Replacer,steering pinion bearing

#### Instrument

Torque wrench,Vernier calipers,Voltage tester

3-2 CIRCUIT DIAGRAM



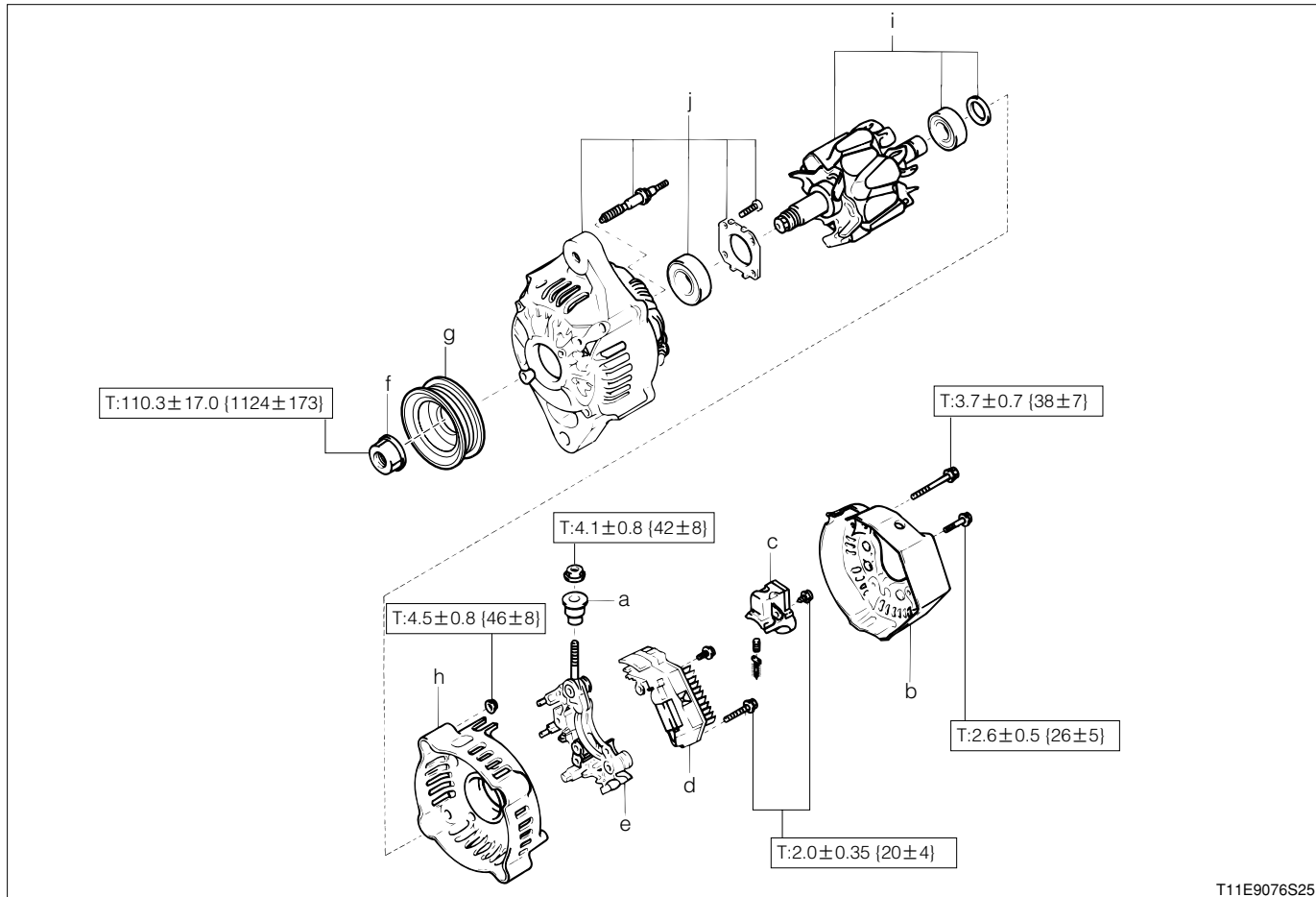
T11E8506ES20

Alternator performance

Engine type	1KR-FE
ITEM	
Rated voltage - Rated output (V-A)	12-65
Output characteristics [13.5V-5000rpm] (A)	67 or more
Permissible max. revolution speed (rpm)	18,000
Regulator regulating voltage [5,000rpm-10A-25] (V)	Hi:14.2-14.8 Lo:12.5-13.1
Rotational direction	Clockwise as viewed from pulley side
Pulley ratio [Crankshaft/alternator]	139.0/52.5
Weight (kg)	3.30

## 3-2-1 ALTERNATOR DISASSEMBLING & ASSEMBLING

### (1) Components



T11E9076S25

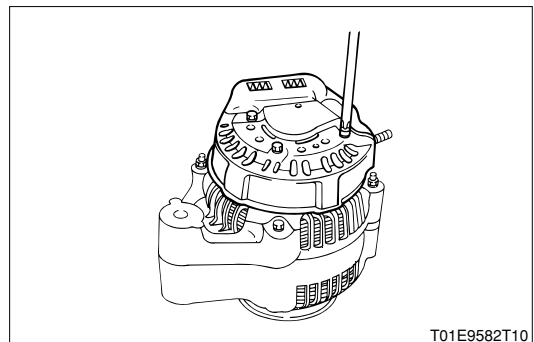
Unit :N·m {kgf·cm}

- |                                 |                                     |
|---------------------------------|-------------------------------------|
| 1 a Insulator, washer terminal  | 6 f Nut, pulley lock                |
| 2 b Cover S/A, end, RR          | 7 g Pulley, alternator              |
| 3 c Holder Ay, alternator brush | 8 h Frame Ay, rectifier end         |
| 4 d Regulator Ay, generator     | 9 i Rotor Ay, alternator            |
| 5 e Holder, W/rectifier         | 10 j Frame Ay, alternator drive end |

### 3-2-2 DISASSEMBLING

#### (1) Cover S/A, end, RR

- 1.Remove the washer terminal insulator.
- 2.Remove the cover S/A.

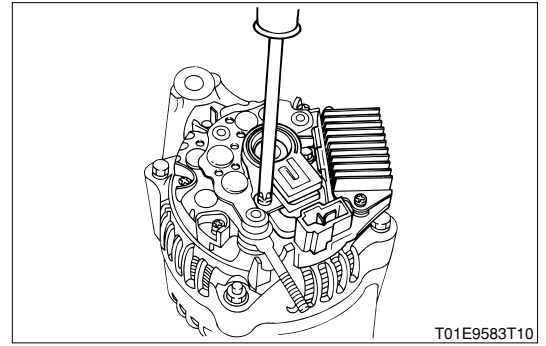


T01E9582T10



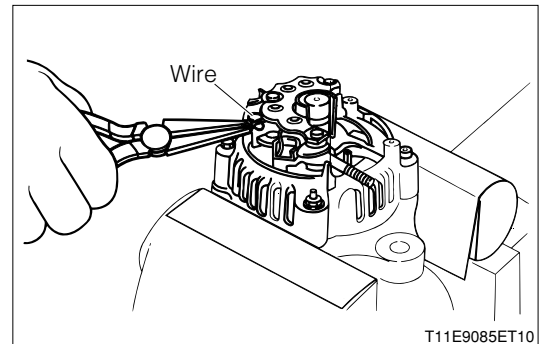
## (2) Regulator Ay, generator

1. Remove the alternator brush holder Ay.
2. Remove the generator regulator Ay.



## (3) Holder, w/rectifier

1. Remove the screws.
2. Remove the holder W/rectifier by extending the wire.



## (4) Pulley, alternator

1. Secure the SST ① to the rotor shaft section by using the SST ②.

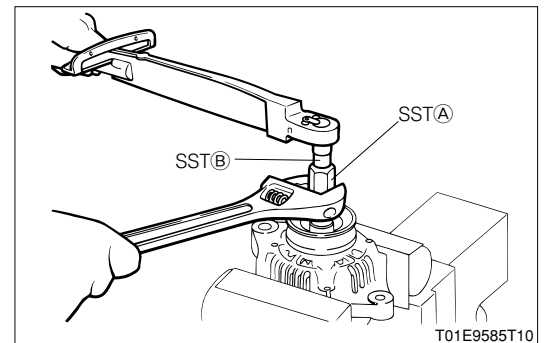
TIGHTENING TORQUE: 110.3N · m{1124kgf · cm}

### NOTE

- Attach the SST to the pulley shaft section securely.

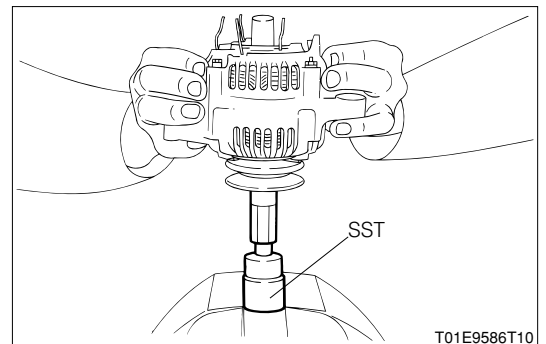
SST: 09820-87201-000 [09820-06010-000]: ①

SST: 09820-87201-000 [09820-87202-000]: ②

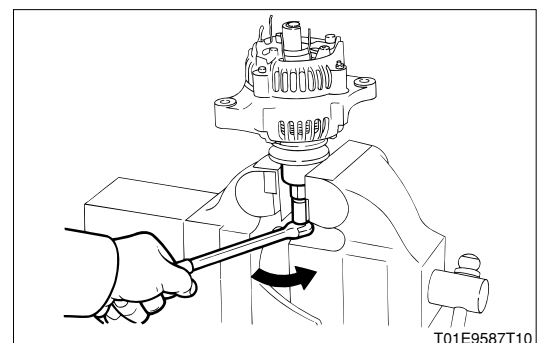


2. Clamp the SST in a vice. Under the state above, set the SST.

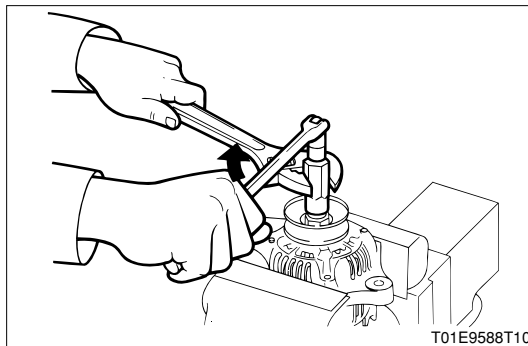
SST: 09820-87201-000 [09820-87202-000]



3. Turn the SST ① in the arrowheaded direction so as to slacken the pulley nut.

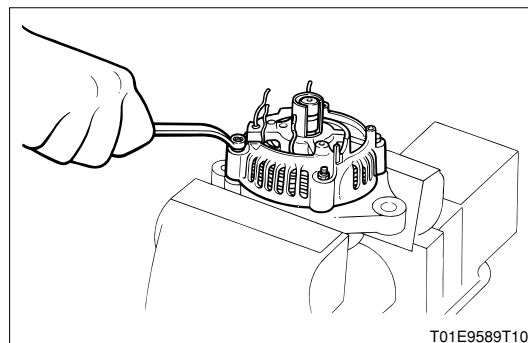


4. Turn the SST ⑥ in the arrowheaded direction so as to remove the SST ⑥ from the alternator.
5. Remove the alternator pulley.



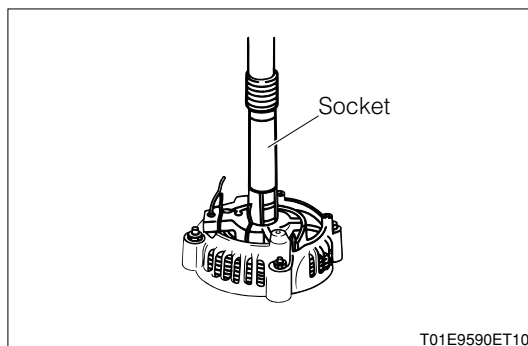
## (5) Frame Ay, rectifier end

1. Remove the frame Ay.



## (6) Frame Ay, alternator drive end

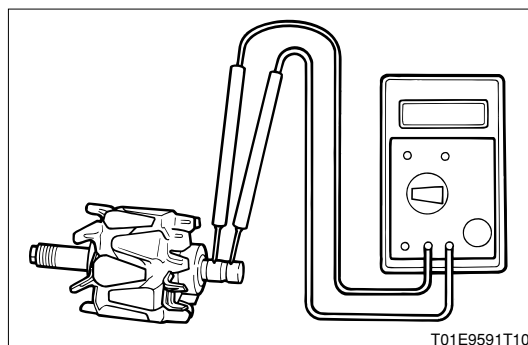
1. Separate the alternator rotor assembly from the frame assembly, using the SST and press.



## 3-2-3 INSPECTION

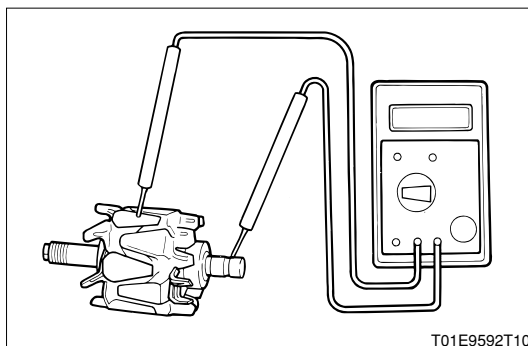
### (1) Resistance check of alternator rotor Ay

1. Measure the resistance between the two slip rings.  
SPECIFIED VALUE:  $2.3\Omega$



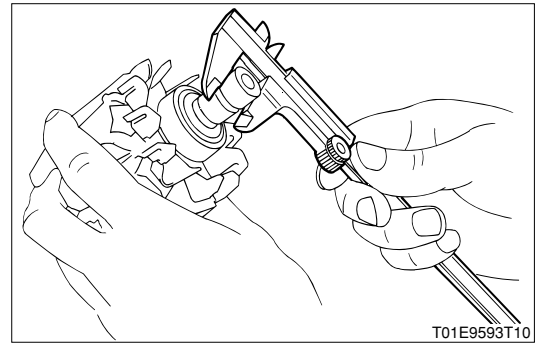
### (2) Continuity check of alternator rotor Ay

1. Measure the insulation resistance between the slip ring and the rotor core.  
SPECIFIED VALUE: No continuity exists



**(3) Slip ring check**

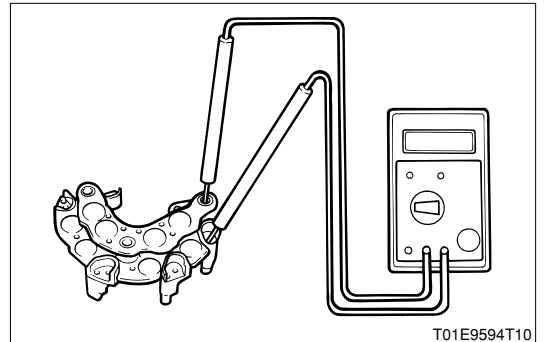
1. Check the slip ring for damage.  
If the slip ring exhibits damage, rectify it, using an abrasive paper (#400).
2. Measure the outer diameter of the slip ring.  
SPECIFIED VALUE: 14.2–14.4mm  
ALLOWABLE LIMIT: 12.8mm

**(4) Check of holder W/rectifier**

1. Conduct the continuity test, using the  $k\Omega$  range.  
SPECIFIED VALUE: Change the polarity. There should be continuity in one direction, while there should be no continuity in the opposite direction.

**CAUTION**

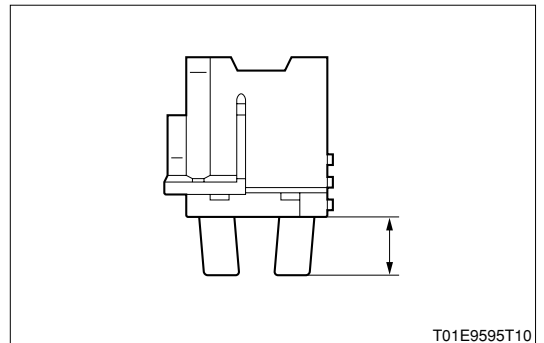
- The diode has such a property that it allows current to flow in one direction only.  
When the test is conducted by means of an electrical tester or a circuit tester, a current flows from the internal cell of the tester to the diode.  
The continuity of a diode (good or bad) is judged based on whether or not that current flows. However, the value of resistance varies, for the current being flown differs depending upon testers.

**(5) Check of alternator brush**

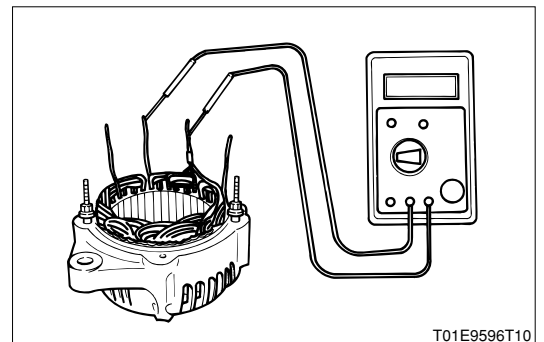
1. Check the brush length.  
SPECIFIED VALUE: 9.5–11.5mm  
ALLOWABLE LIMIT: 1.5mm

**CAUTION**

- Replace the brush, if it exceeds the allowable limit.

**(6) Stator coil check**

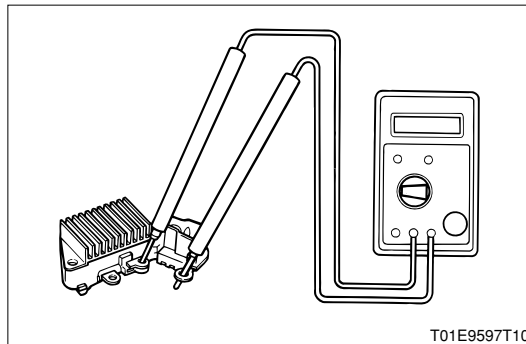
1. Measure the resistance between the phases.  
SPECIFIED VALUE:  $0.07\Omega$



## (7) Check of regulator **Ay**, generator

1. Conduct the continuity test for the diode between the terminal B and the terminal F, using the  $k\Omega$  range of the tester.

**SPECIFIED VALUE:** There should be continuity in one direction, while there should be no continuity in the opposite direction.



## (8) Check of bearing (Rotor **Ay**, alternator rear side)

1. Check for wear and damage. Lightly turn to check that the part turns without any binding or abnormal noise.

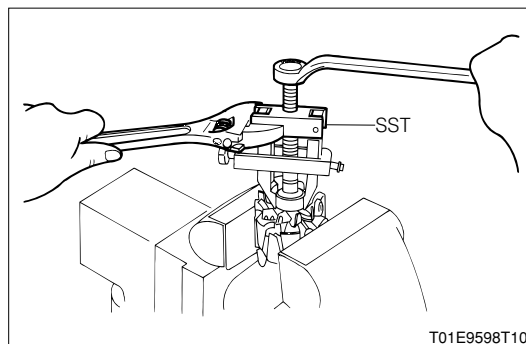
**SPECIFIED VALUE:** No wear nor damage.  
No binding nor abnormal noise.

## 3-2-4 REPLACEMENT

### (1) Replacement of bearing (Rotor **Ay**, alternator rear side)

1. Remove the bearing, using the SST.

SST: 09820-00021-000

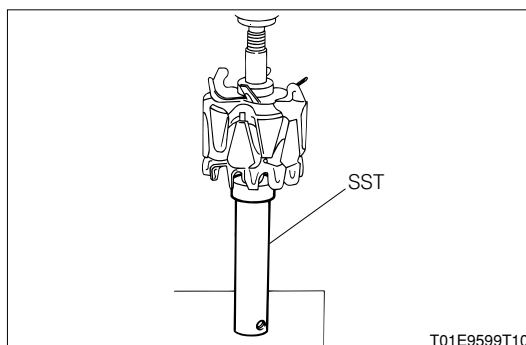


2. Press the bearing, using the SST in combination with a press.

SST: 09612-87180-000 [09612-10061-000]

### **CAUTION**

- Perform the press-fitting at the inner race side of the bearing.



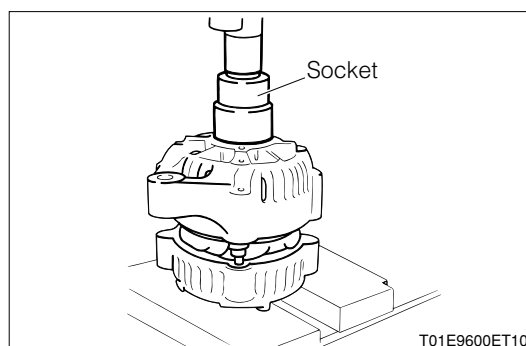
## 3-2-5 ASSEMBLING

### (1) Rotor **Ay**, alternator

1. Attach the rotor assembly to the drive end frame assembly.

### (2) Frame **Ay**, rectifier

1. Press the rectifier end frame assembly, using a 29 mm socket wrench in combination with a press.



**(3) Pulley, alternator**

1. Install the pulley to the shaft section of the rotor. Tighten the pulley lock nut temporarily.

2. Tighten the SST<sup>®</sup> to the specified torque so that the SST<sup>®</sup> may be attached to the pulley shaft.

SST: 09820-87201-000 [09820-06010-000]: <sup>Ⓐ</sup>

SST: 09820-87201-000 [09820-87202-000]: <sup>Ⓑ</sup>

TIGHTENING TORQUE: 39 N·m{400 kgf·cm}

**CAUTION**

- Make sure that SST is securely installed to the shaft section of the rotor.

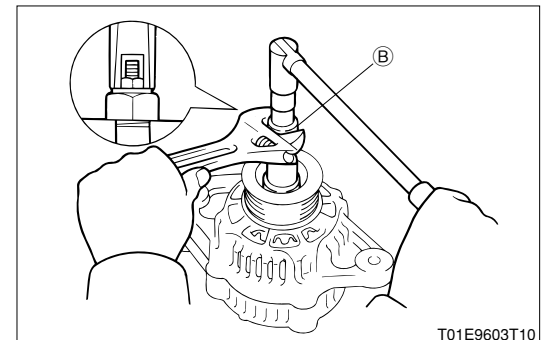
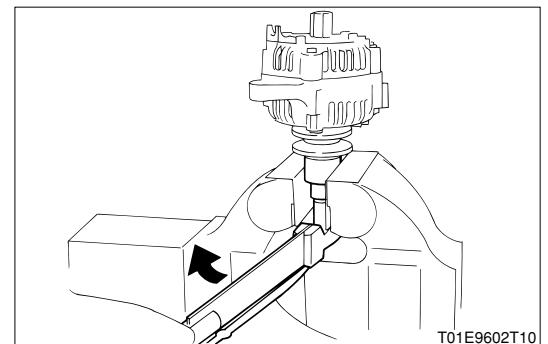
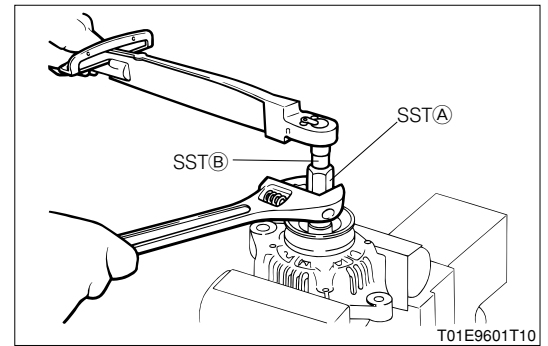
3. Clamp the SST in a vice. Set the alternator and the SST.

SST: 09820-87201-000 [09820-87202-000]

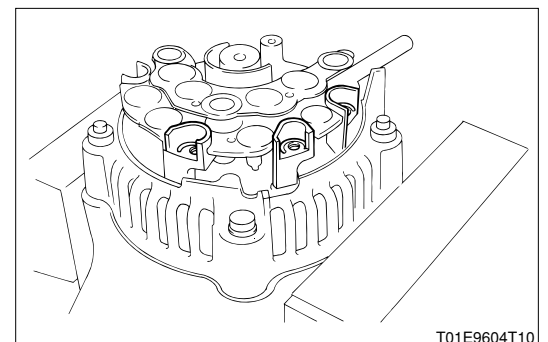
4. Tighten the pulley lock nut by using the SST <sup>Ⓐ</sup>.

TIGHTENING TORQUE: 110.3N·m {1124kgf·cm}

5. Remove the alternator from the SST. Slacken the SST <sup>Ⓑ</sup> so as to remove the SSTs<sup>Ⓐ</sup> and <sup>Ⓑ</sup>.

**(4) Holder, w/rectifier**

1. Install the alternator holder with rectifier wire, as indicated in the right figure.

**(5) Cover S/A, end, RR**

1. Assemble the generator regulator Ay.
2. Assemble the alternator brush Holder Ay.
3. Assemble the cover.
4. Assemble the washer terminal insulator.