

CHARGING SYSTEM

(2RZ-FE, 3RZ-FE)

PRECAUTION	CH- 2
PREPARATION	CH- 2
ON-VEHICLE INSPECTION	CH- 3
GENERATOR	CH- 6
SERVICE SPECIFICATIONS.....	CH- 15

(5VZ-FE)

PRECAUTION	CH- 16
PREPARATION	CH- 16
ON-VEHICLE INSPECTION	CH- 17
GENERATOR	CH- 20
SERVICE SPECIFICATIONS.....	CH- 28

(2RZ—FE, 3RZ—FE)**PRECAUTION**

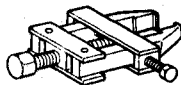
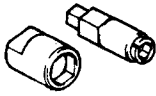
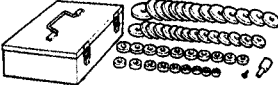
CH00J—00

1. Check that the battery cables are connected to the correct terminals.
2. Disconnect the battery cables when the battery is given a quick charge.
3. Do not perform tests with a high voltage insulation resistance tester.
4. Never disconnect the battery while the engine is running.

PREPARATION

CH00Q—00

SST (SPECIAL SERVICE TOOLS)

	09285—76010 Injection Pump Camshaft Bearing Cone Replacer	Rotor rear bearing cover
	09286—46011 Injection Pump Spline Shaft Puller	Rectifier end frame
	09820—00021 Alternator Rear Bearing Puller	
	09820—00030 Alternator Rear Bearing Replacer	Rotor rear bearing
	09820—63010 Alternator Pulley Set Nut Wrench Set	
	09950—60010 Replacer Set	Rotor front bearing
	(09951—00260) Replacer 26	
	(09951—00500) Replacer 50	
	(09952—06010) Adapter	

RECOMMENDED TOOLS



09082—00050 TOYOTA Electrical Tester Set.

EQUIPMENT

Ammeter(A)	
Battery specific gravity gauge	
Belt tension gauge	
Torque wrench	
Vernier calipers	Rotor (Slip ring), Brush

CH

ON—VEHICLE INSPECT ION

1. Except Delco Battery:

CHECK BATTERY ELECTROLYTE LEVEL AND VOLTAGE

- (a) Check the electrolyte quantity of each cell.
If under the lower level, replace the battery (or add distilled water if possible) and check the charging system.
- (b) Measure the battery voltage between the terminals negative (—) and positive (+) of the battery.

Standard voltage:

At 20°C (68°F): 12.7 — 12.9 V

HINT:

- Before measuring the voltage, turn the ignition switch OFF and turn off the electrical systems (headlight, blower motor, rear defogger etc.).
- If the vehicle has been running, wait 5 minutes or more after the vehicle stops before measuring the battery voltage.

If the voltage is less than the specification, charge the battery.

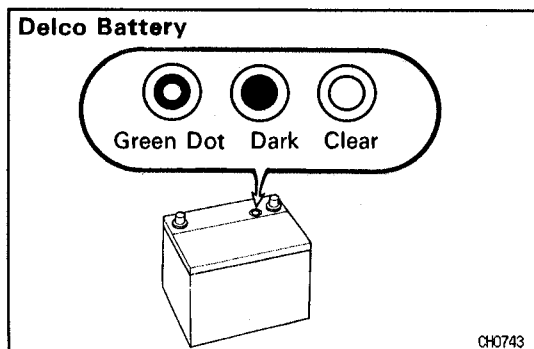
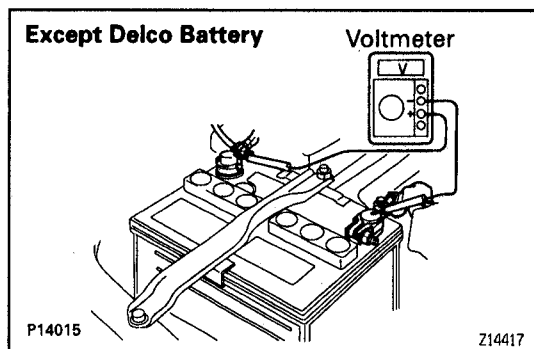
2. Delco Battery:

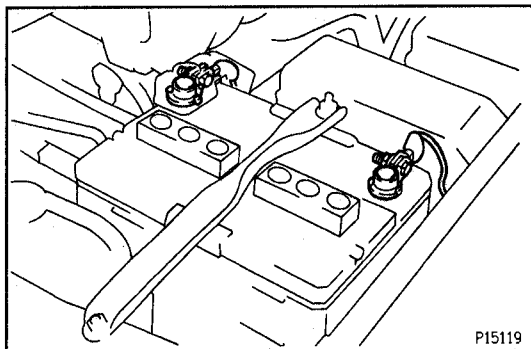
CHECK HYDROMETER

Green Dot visible: The battery is adequately charged.

Dark (Green Dot not visible): The battery must be charged.

Clear or Light Yellow: Replace the battery.

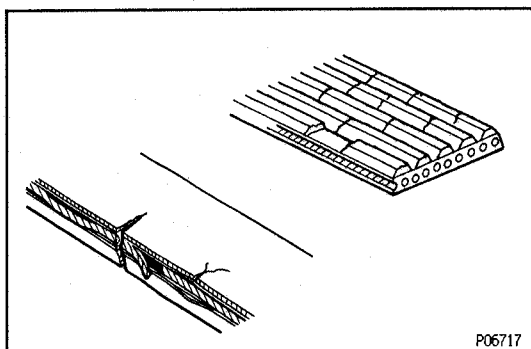




HINT: There is no need to add water during the entire service life of the battery.

3. CHECK BATTERY TERMINALS, FUSIBLE LINK AND FUSES

- (a) Check that the battery terminals are not loose or corroded.
- (b) Check the fusible link, H—fuses and fuses for continuity.



4. INSPECT DRIVE BELT

- (a) Visually check the belt for excessive wear, frayed cords etc.

If any defect has been found, replace the drive belt.

HINT: Cracks on the rib side of a belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.

- (b) Using a belt tension gauge, measure the belt tension.

Belt tension gauge:

Nippondenso BTG—20 (95506—00020)

Borroughs No. BT—33—73F

Drive belt tension:

New belt 165 ± 10 lbf

Used belt 115 ± 20 lbf

If the belt tension is not as specified, adjust it.

HINT:

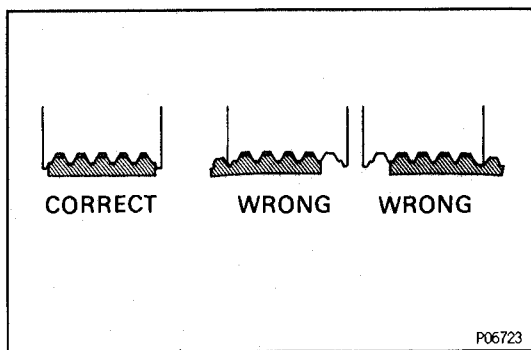
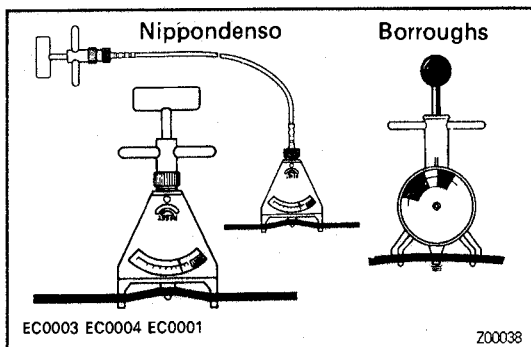
- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing a belt, check that it fits properly in the ribbed grooves.
- Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.
- After installing a new belt, run the engine for about 5 minutes and recheck the belt tension.

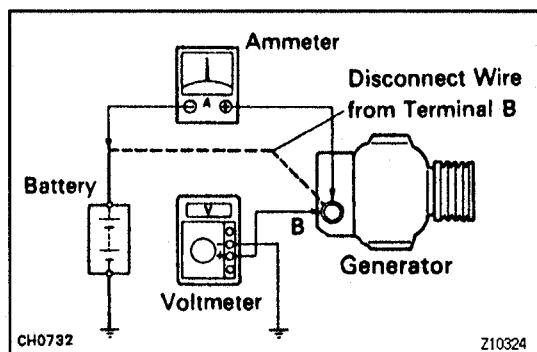
5. VISUALLY CHECK GENERATOR WIRING AND LISTEN FOR ABNORMAL NOISES

- (a) Check that the wiring is in good condition.
- (b) Check that there is no abnormal noise from the generator while the engine is running.

6. INSPECT DISCHARGE WARNING LIGHT CIRCUIT

- (a) Turn the ignition switch "ON". Check that the discharge warning light comes on.
 - (b) Start the engine. Check that the light goes off.
- If the light does not operate as specified, troubleshoot the discharge warning light circuit.





7. INSPECT CHARGING CIRCUIT WITHOUT LOAD

HINT: If a battery/generator tester is available, connect the tester to the charging circuit as per the manufacturer's instructions.

- (a) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows:

- Disconnect the wire from terminal B of the generator and connect it to the negative (—) lead of the ammeter.
- Connect the positive (+) lead of the ammeter to terminal B of the generator.
- Connect the positive (+) lead of the voltmeter to terminal B of the generator.
- Ground the negative (—) lead of the voltmeter.

- (b) Check the charging circuit as follows:

With the engine running from idle to 2,000 rpm, check the reading on the ammeter and voltmeter.

Standard amperage:

10 A or less

Standard voltage:

At 25°C (77°F): 14.0 — 15.0 V

At 115°C (239°F): 13.5 — 14.3 V

If the voltmeter reading is more than the standard voltage, replace the voltage regulator.

If the voltmeter reading is less than the standard voltage, check the voltage regulator and generator as follows:

- With terminal F grounded, start the engine and check the voltmeter reading of terminal B.
- If the voltmeter reading is more than the standard voltage, replace the voltage regulator.
- If the voltmeter reading is less than the standard voltage, check the generator.

8. INSPECT CHARGING CIRCUIT WITH LOAD

- (a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater blower switch at "HI".

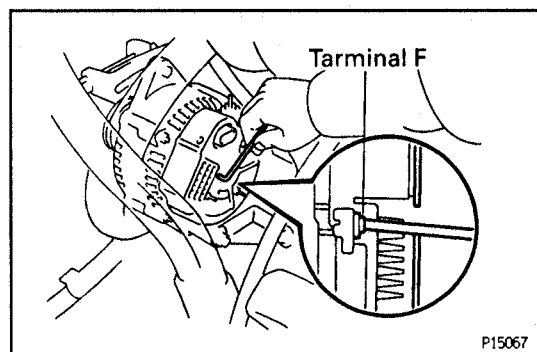
- (b) Check the reading on the ammeter.

Standard amperage:

30 A or more

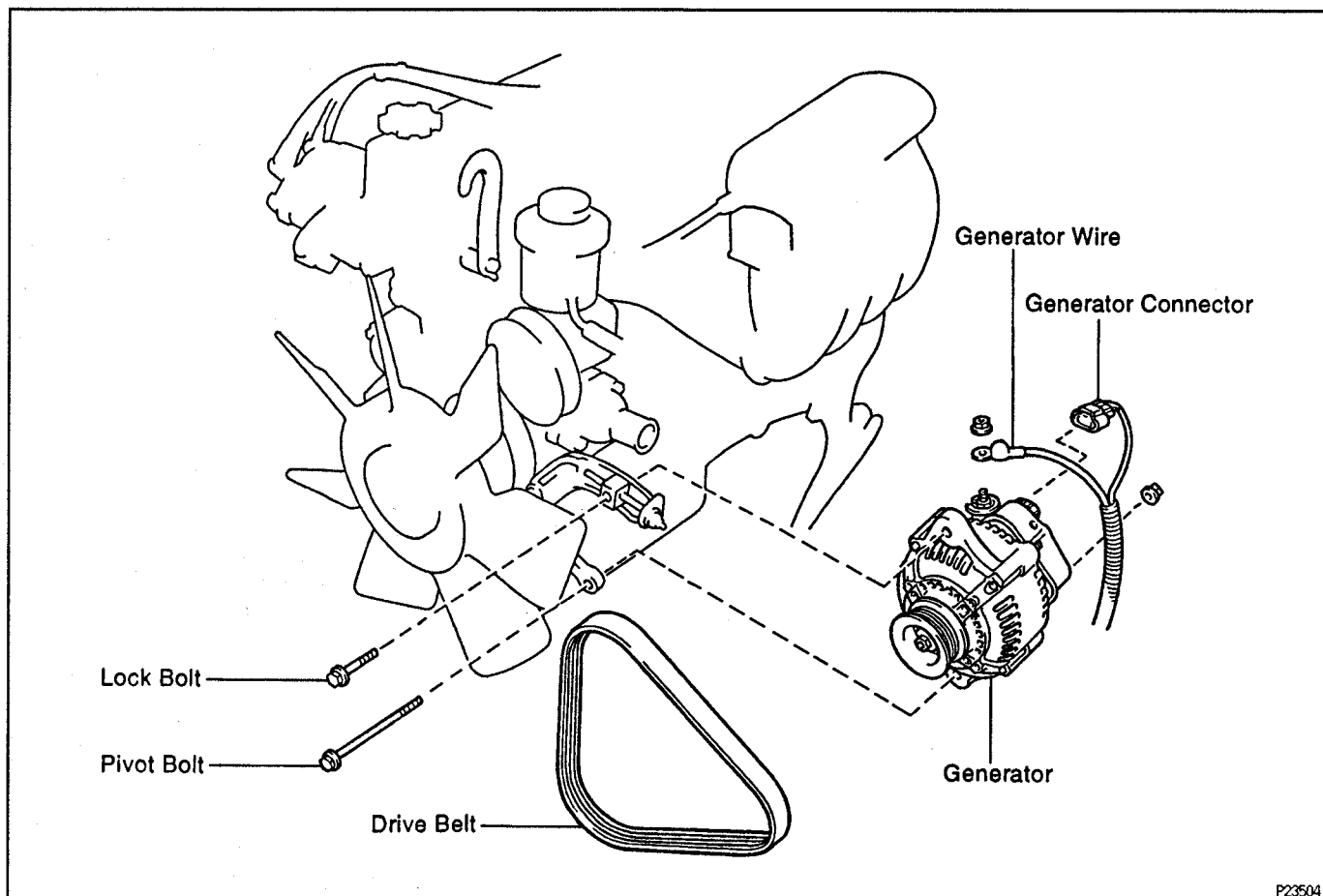
If the ammeter reading is less than the standard amperage, repair the generator.

HINT: If the battery is fully charged, the indication will sometimes be less than the standard amperage.

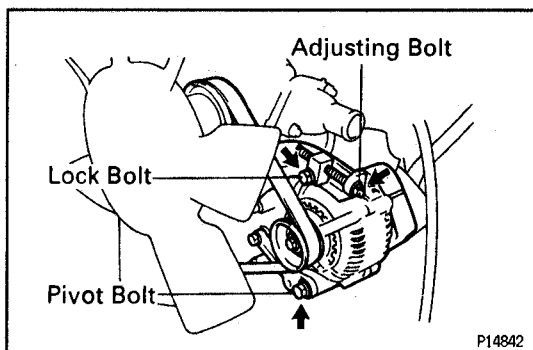


GENERATOR COMPONENTS FOR REMOVAL AND INSTALLATION

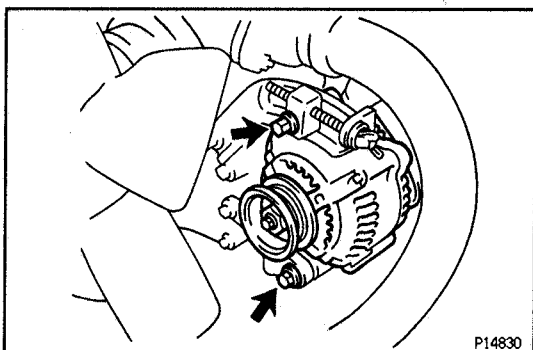
CH03G-08



P23504



P14842



P14830

GENERATOR REMOVAL

CH06J-02

1. REMOVE DRIVE BELT

- (a) Loosen the lock bolt, pivot bolt, nut and adjusting bolt.
- (b) Remove the drive belt.

2. REMOVE GENERATOR

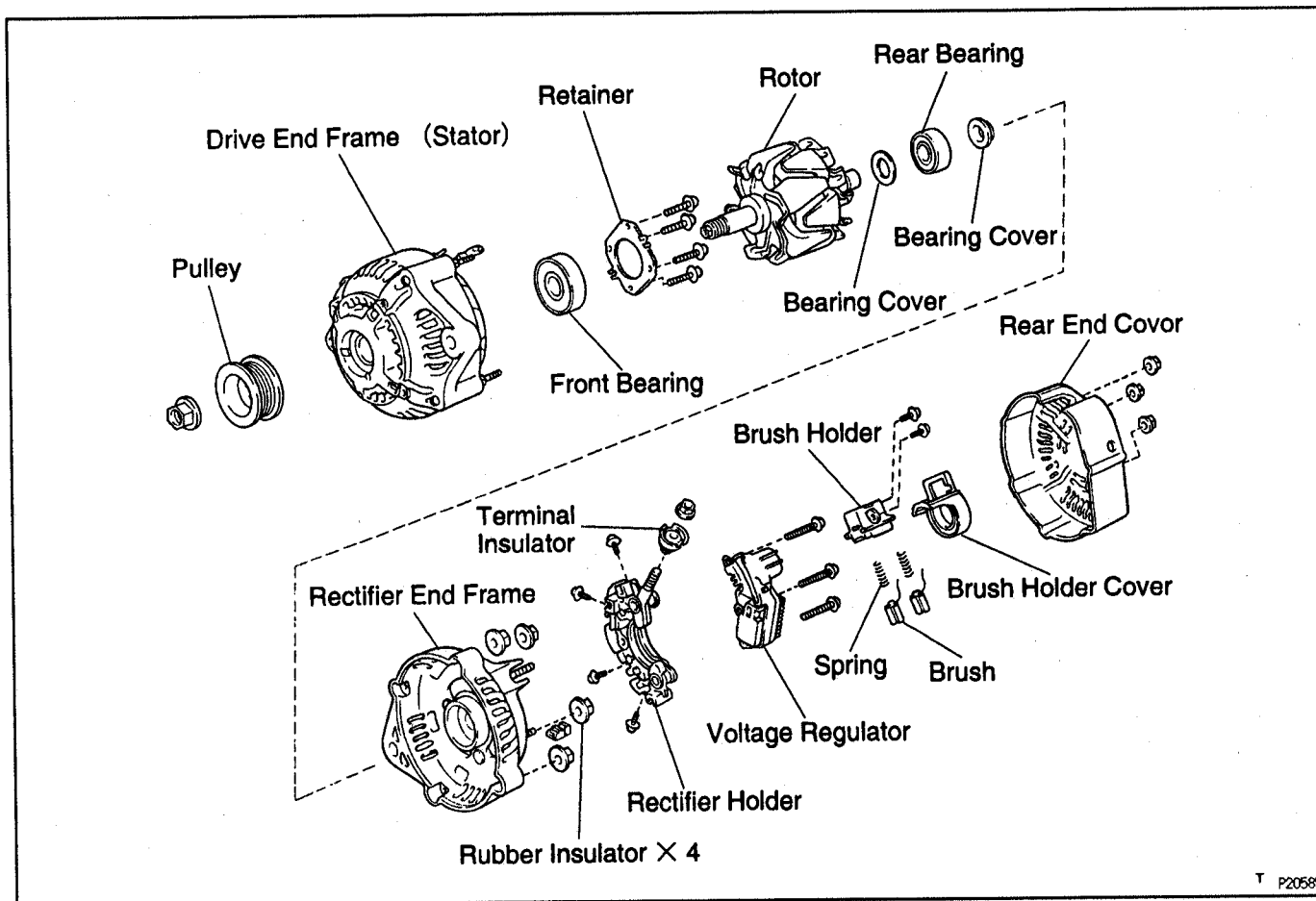
- (a) Disconnect the generator connector.
- (b) Remove the nut, and disconnect the generator wire.
Torque: 9.8 N·m (100 kgf·cm, 7.2 ft·lbf)
- (c) Disconnect the wire harness with the clip.
- (d) Remove the lock bolt, pivot bolt, nut and generator.

Torque:

Pivot bolt: 59 N·m (600kgf·cm, 43 ft·lbf)

Lock bolt: 29 N·m (300kgf·cm, 21 ft·lbf)

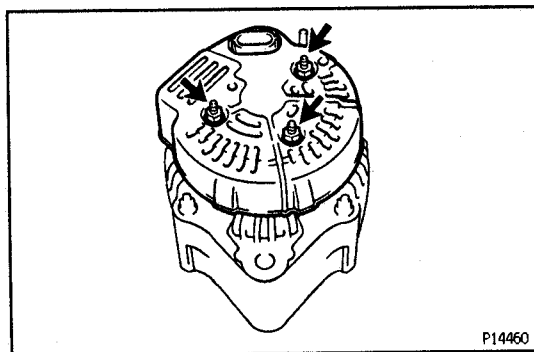
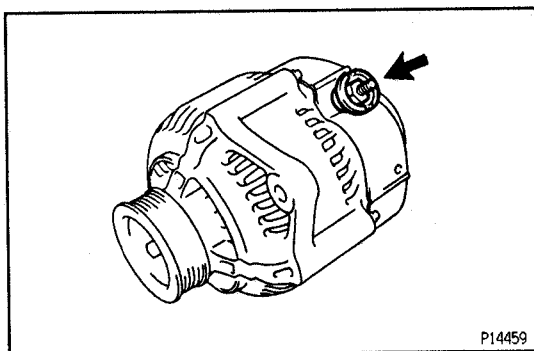
COMPONENTS FOR DISASSEMBLY AND ASSEMBLY

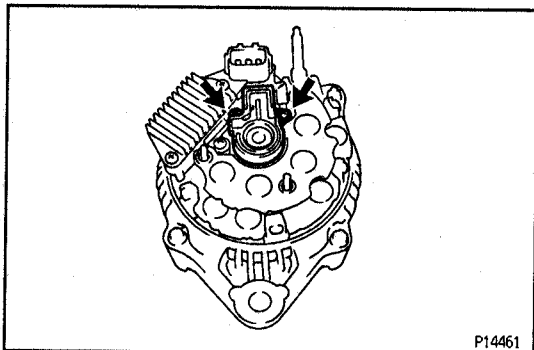


CH0AJ-01

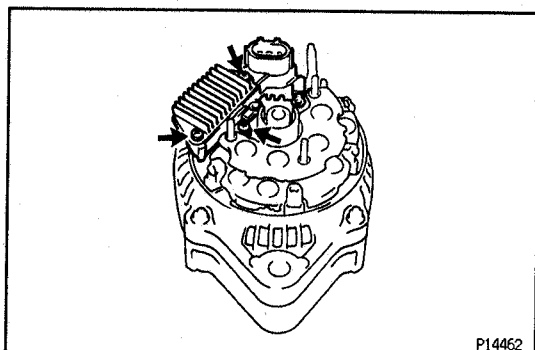
GENERATOR DISASSEMBLY

1. REMOVE REAR END COVER
 - (a) Remove the nut and terminal insulator.
 - (b) Remove the 3 nuts, and end cover.

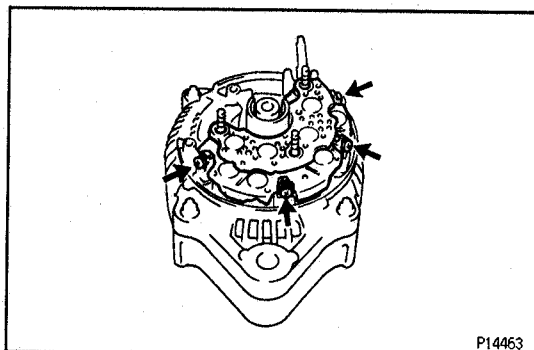


**2. REMOVE BRUSH HOLDER**

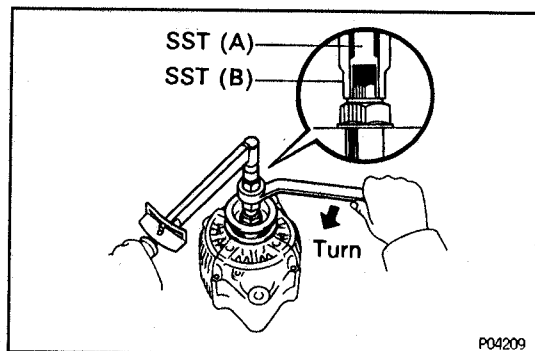
- (a) Remove the 2 screws and brush holder.
- (b) Remove the brush holder cover from the brush holder.

**3. REMOVE VOLTAGE REGULATOR**

Remove the 3 screws and voltage regulator.

**4. REMOVE RECTIFIER HOLDER**

- (a) Remove the 4 screws and rectifier holder.
- (b) Remove the 4 rubber insulators.

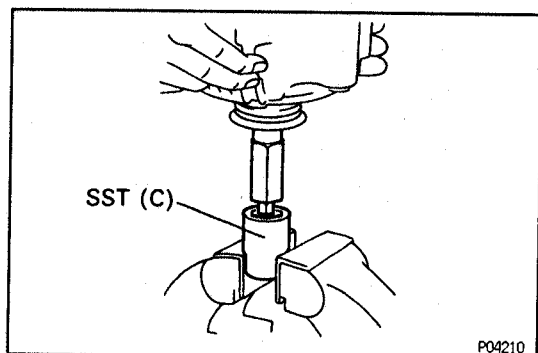
**5. REMOVE PULLEY**

- (a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.

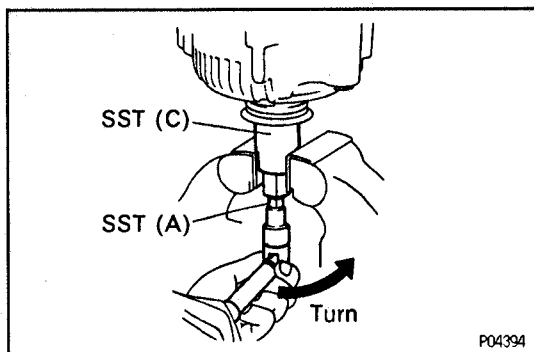
SST 09820—63010

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

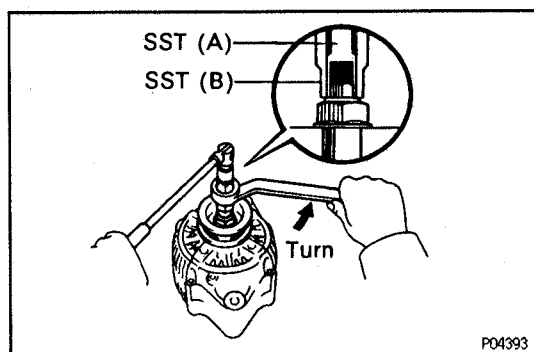
- (b) Check that SST (A) is secured to the rotor shaft.



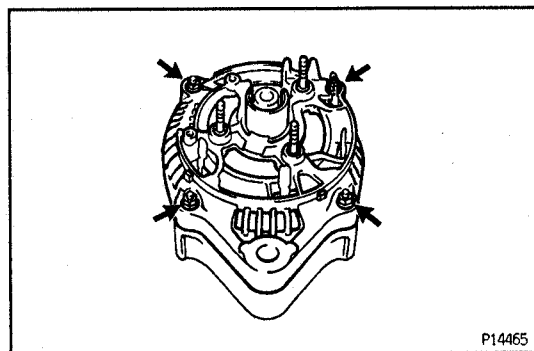
- (c) Mount SST (C) in a vise.
- (d) Install the generator to SST (C).



- (e) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.
NOTICE: To prevent damage to the rotor shaft, do not loosen the pulley nut more than one-half of a turn.
 (f) Remove the generator from SST (C).

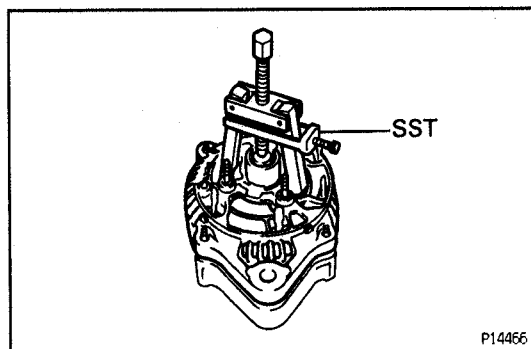


- (g) Turn SST (B) and remove SST (A and B).
 (h) Remove the pulley nut and pulley.



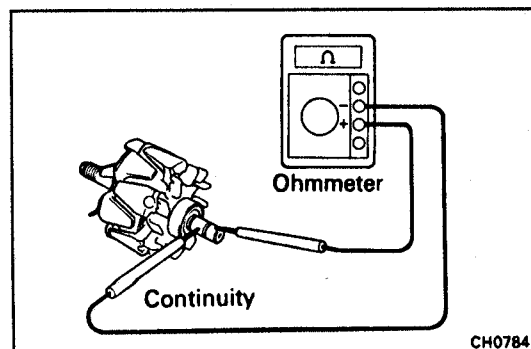
6. REMOVE RECTIFIER END FRAME

- (a) Remove the 4 nuts.



- (b) Using SST, remove the rectifier end frame.
 SST 09286—46011

7. REMOVE ROTOR FROM DRIVE END FRAME



GENERATOR INSPECTION AND REPAIR

CHOAK-01

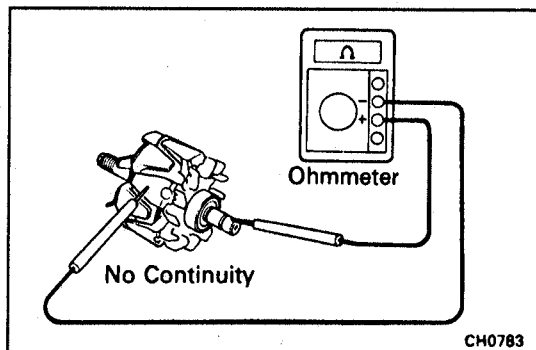
1. INSPECT ROTOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance (Cold):

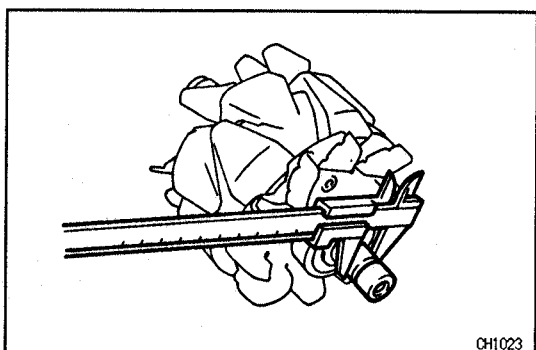
2.8 — 3.0 Ω

If there is no continuity, replace the rotor.

**2. INSPECT ROTOR FOR GROUND**

Using an ohmmeter, check that there is no continuity between the slip ring and rotor.

If there is continuity, replace the rotor.

**3. INSPECT SLIP RINGS**

- (a) Check that the slip rings are not rough or scored. If rough or scored, replace the rotor.

- (b) Using a vernier caliper, measure the slip ring diameter.

Standard diameter:

14.2 — 14.4 mm (0.559 — 0.567 in.)

Minimum diameter:

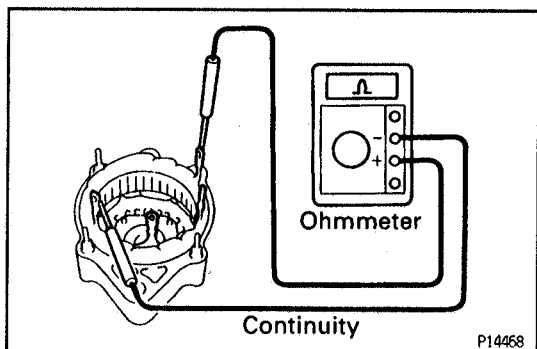
12.8 mm (0.504 in.)

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

Stator (Drive End Frame)**1. INSPECT STATOR FOR OPEN CIRCUIT**

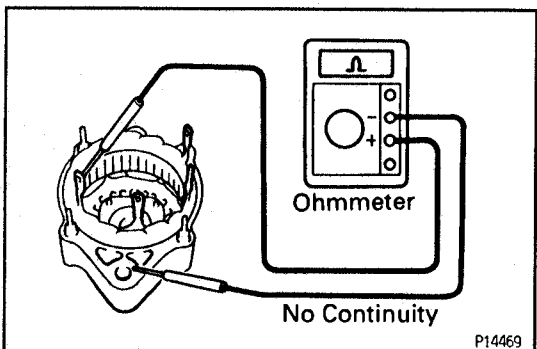
Using an ohmmeter, check that there is continuity between the coil leads.

If there is no continuity, replace the drive end frame assembly.

**2. INSPECT STATOR FOR GROUND**

Using an ohmmeter, check that there is no continuity between the coil lead and drive end frame.

If there is continuity, replace the drive end frame assembly.

**Brushes****1. INSPECT EXPOSED BRUSH LENGTH**

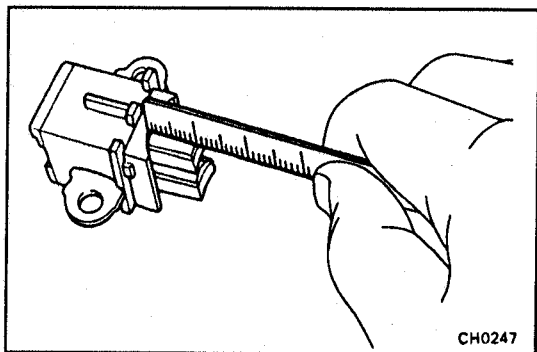
Using a scale, measure the exposed brush length.

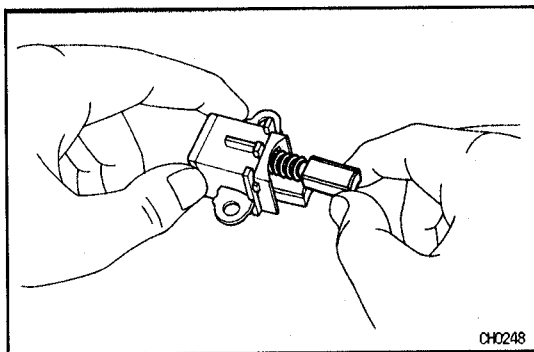
Standard exposed length:

10.5 mm (0.413 in.)

Minimum exposed length:

1.5 mm (0.059 in.)

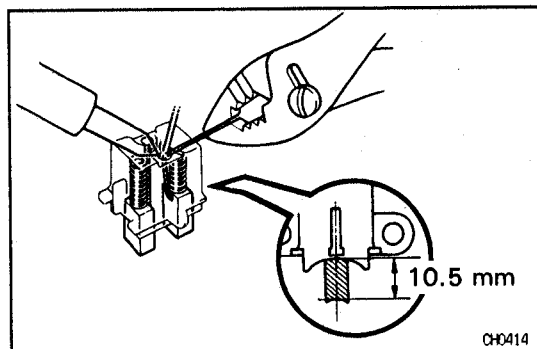




If the exposed length is less than the minimum, replace the brushes.

2. IF NECESSARY, REPLACE BRUSHES

- (a) Unsolder and remove the brush and spring.
- (b) Run the wire of a new brush through the spring and the hole in the brush holder, and insert the spring and brush into the brush holder.

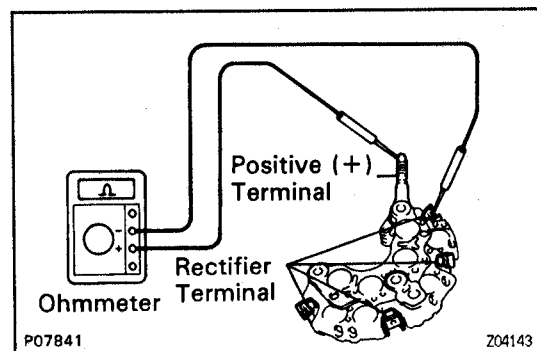


- (c) Solder the brush wire to the brush holder at specified exposed length.

Exposed length:

10.5 mm (0.413 in.)

- (d) Check that the brush moves smoothly in the brush holder.
- (e) Cut off the excess wire.
- (f) Apply insulation paint to the soldered area.



Rectifiers (Rectifier Holder)

1. INSPECT POSITIVE RECTIFIER

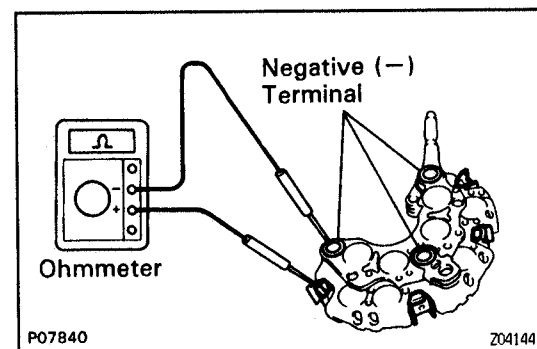
- (a) Using an ohmmeter, connect one tester probe to the positive (+) terminal and the other to each rectifier terminal.
- (b) Reverse the polarity of the tester probes and repeat step (a).
- (c) Check that one shows continuity and the other shows no continuity.

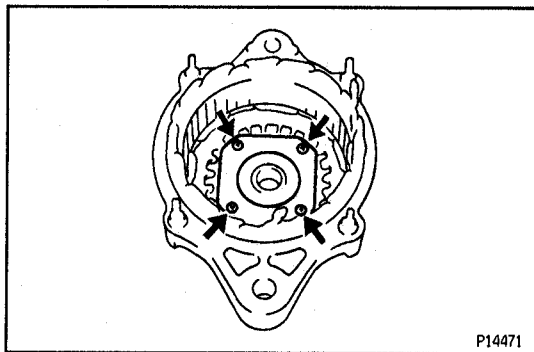
If continuity is not as specified, replace the rectifier holder.

2. INSPECT NEGATIVE RECTIFIER

- (a) Using an ohmmeter, connect one tester probe to each negative (—) terminal and the other to each rectifier terminal.
- (b) Reverse the polarity of the tester probes and repeat step (a).
- (c) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.





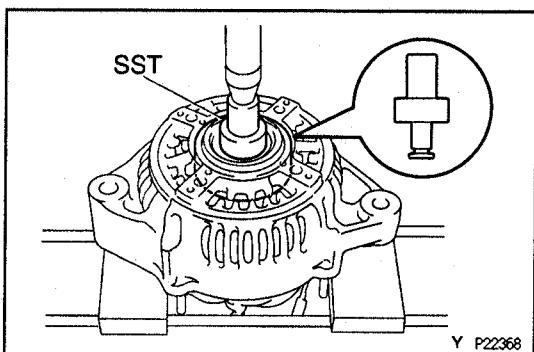
Bearings

1. INSPECT FRONT BEARING

Check that the bearing is not rough or worn.

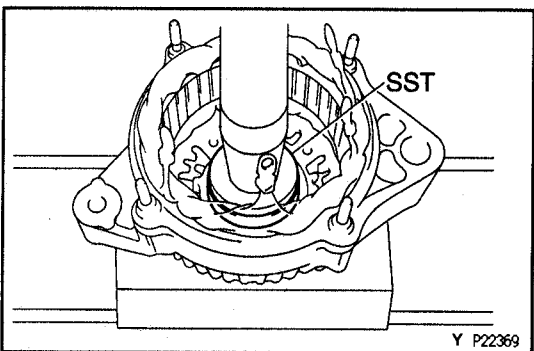
2. IF NECESSARY, REPLACE FRONT BEARING

- (a) Remove the 4 screws, bearing retainer and bearing.



- (b) Using SST and press, press out the bearing.

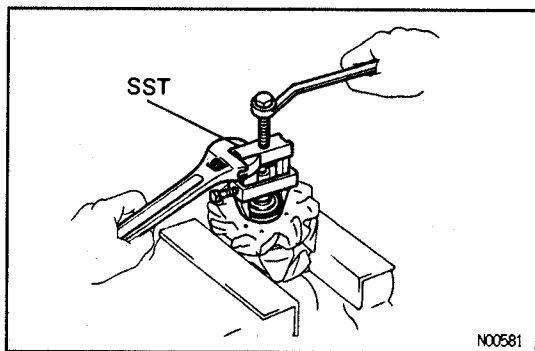
SST 09950-60010 (09951-00260, 09952-06010)



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

SST 09950-60010 (09951-00500)

- (d) Install the bearing retainer with the 4 screws.



3. INSPECT REAR BEARING

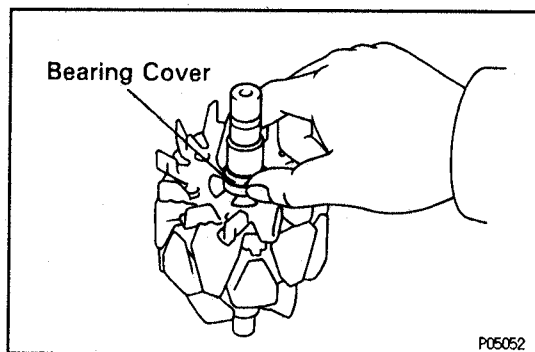
Check that the bearing is not rough or worn.

4. IF NECESSARY, REPLACE REAR BEARING

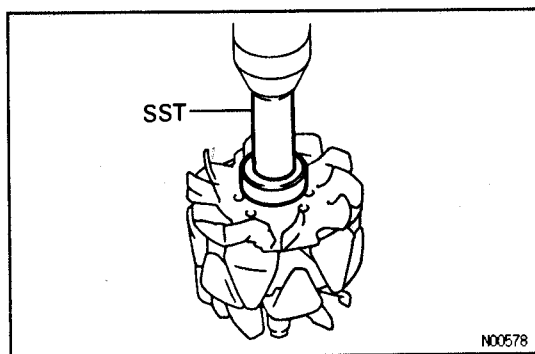
- (a) Using SST, remove the bearing covers and bearing.

SST 09820-00021

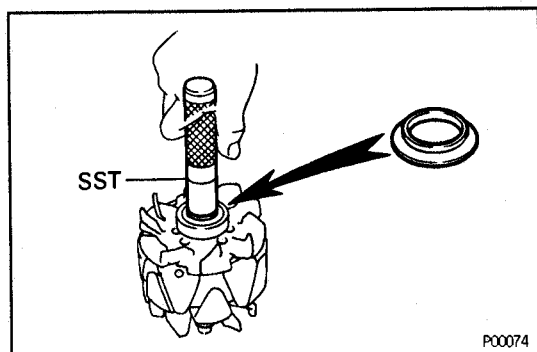
NOTICE: Be careful not to damage the fan.



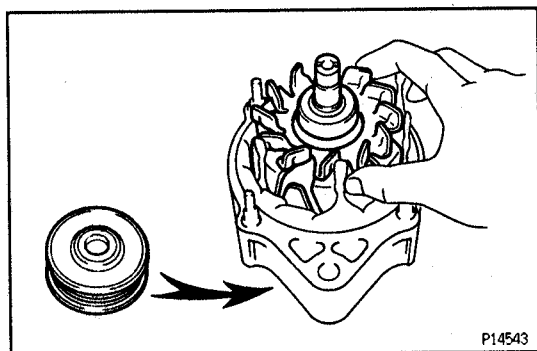
- (b) Place the bearing cover on the rotor.



- (c) Using SST and a press, press in a new bearing.
SST 09820-00030



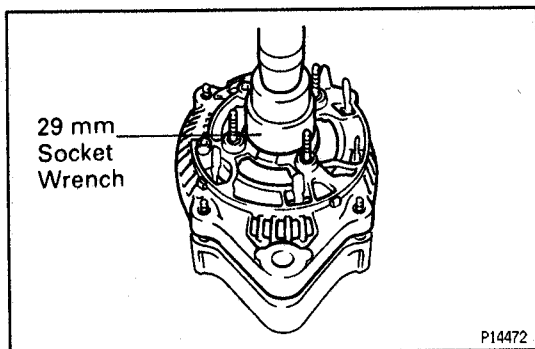
- (d) Using SST, push in the bearing cover.
SST 09285-76010



GENERATOR ASSEMBLY

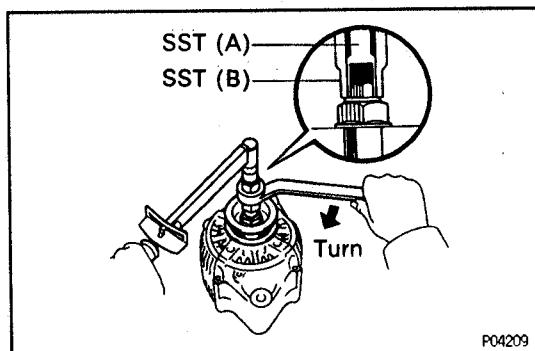
1. PLACE DRIVE END FRAME ON PULLEY
2. INSTALL ROTOR TO DRIVE END FRAME

CH0AL-01



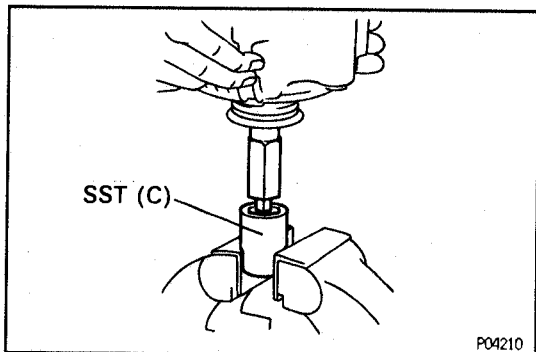
3. INSTALL RECTIFIER END FRAME

- (a) Using a 29 mm socket wrench and press, slowly press in the rectifier end frame.
- (b) Install the 4 nuts.
Torque: 4.5 N·m (46 kgf·cm, 40 in.-lbf)

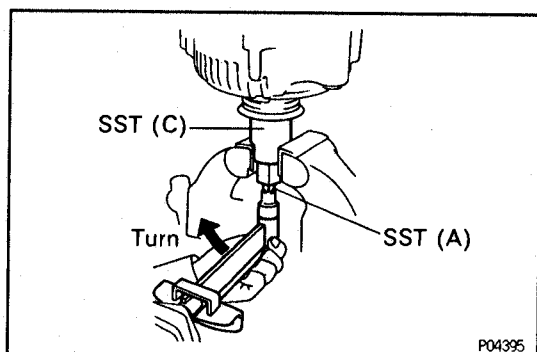


4. INSTALL PULLEY

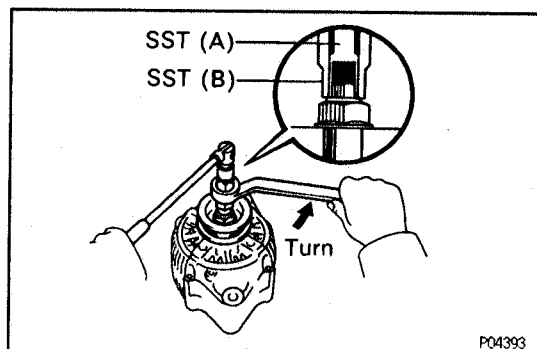
- (a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.
- (b) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
SST 09820-63010
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
- (c) Check that SST (A) is secured to the pulley shaft.



- (d) Mount SST (C) in a vise.
- (e) Install the generator to SST (C).



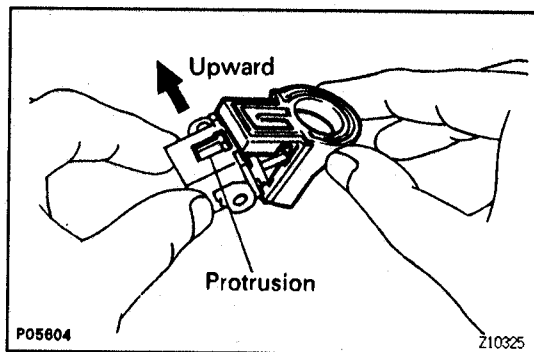
- (f) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.
Torque: 110 N·m (1,125 kgf·cm, 81 ft·lbf)
- (g) Remove the generator from SST (C).



- (h) Turn SST (B), and remove SST (A and B).

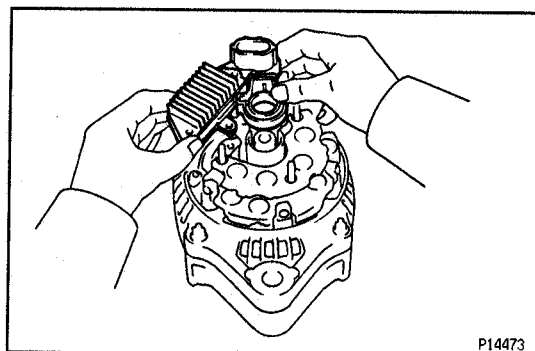
5. INSTALL RECTIFIER HOLDER

- (a) Install the 4 rubber insulators on the lead wires.
- (b) Install the rectifier holder with the 4 screws.
Torque: 1.96 N·m (20 kgf·cm, 17.4 in.-lbf)

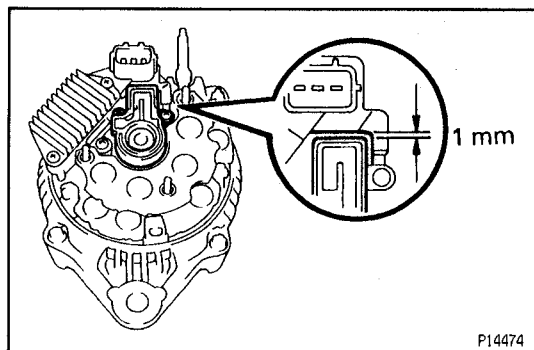


6. INSTALL VOLTAGE REGULATOR AND BRUSH HOLDER

- (a) Install the brush holder cover to the brush holder.
NOTICE: Be careful of the holder installation direction.



- (b) Place the voltage regulator together with the brush holder horizontally on the rectifier end frame.



- (c) Install the 5 screws until there is a clearance of approx. 1 mm (0.04 in.) between the brush holder and connector.

- (d) Fit the brush holder cover.

7. INSTALL REAR END COVER

- (a) Install the end cover with the 3 nuts.
Torque: 4.5 N·m (46 kgf·cm, 40 in·lbf)
- (b) Install the terminal insulator with the nut.
Torque: 4.1 N·m (42 kgf·cm, 36 in·lbf)

8. CHECK THAT ROTOR ROTATES SMOOTHLY GENERATOR INSTALLATION

CH03M-01

Installation is in the reverse order of removal.

SERVICE SPECIFICATIONS SERVICE DATA

CH03M-0A

Battery	Standard voltage	at 20°C (68°F)	12.7 – 12.9 V
Drive belt	Tension		
	New belt		165 ± 10 lbf
	Used belt		115 ± 20 lbf
Generator	Rated output		12 V – 60 A
	Rotor coil resistance		2.8 – 3.0 Ω
	Slip ring diameter	STD	14.2 mm – 14.4 mm (0.559 – 0.567 in.)
	Slip ring diameter	Minimum	12.8 mm (0.504 in.)
	Brush exposed length	STD	10.5 mm (0.413 in.)
	Brush exposed length	Minimum	1.5 mm (0.059 in.)
Voltage regulator	Regulating voltage	at 25°C (77°F)	14.0 – 15.0 V
	Regulating voltage	at 115°C (239°F)	13.5 – 14.3 V

CH03M-0B

TORQUE SPECIFICATIONS

Part tightened	N·m	kgf·cm	ft·lbf
Drive end frame x Rectifier end frame	4.5	46	40 in·lbf
Generator pulley nut	110	1,125	81
Rectifier holder set screw	1.96	20	17.4 in·lbf
Rear end cover x Rectifier end frame	4.5	46	40 in·lbf
Terminal insulator mounting nut	4.1	42	36 in·lbf
Pivot bolt (For generator)	59	600	43
Lock bolt (For generator)	29	300	21
Generator wire mounting nut	9.8	100	7.2

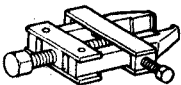
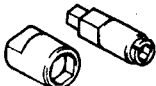
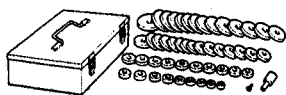
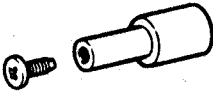
(5VZ—FE)**PRECAUTION**

1. Check that the battery cables are connected to the correct terminals.
2. Disconnect the battery cables when the battery is given a quick charge.
3. Do not perform tests with a high voltage insulation resistance tester.
4. Never disconnect the battery while the engine is running.

CH031-04

PREPARATION**SST (SPECIAL SERVICE TOOLS)**

CH034-03

	09285-76010 Injection Pump Camshaft Bearing Cone Replacer	Rotor rear bearing cover
	09286-46011 Injection Pump Spline Shaft Puller	Rectifier end frame
	09820-00021 Alternator Rear Bearing Puller	
	09820-00030 Alternator Rear Bearing Replacer	
	09820-63010 Alternator Pulley Set Nut Wrench Set	
	09950-60010 Replacer Set	Rotor front bearing
	(09951-00260) Replacer 26	
	(09951-00500) Replacer 50	
	(09952-06010) Adapter	

RECOMMENDED TOOLS

CH035-04



09082-00050 TOYOTA Electrical Tester Set.

EQUIPMENT

CH036-03

Battery specific gravity gauge	Battery
Belt tension gauge	
Torque wrench	
Vernier calipers	Rotor (Slip ring)

CH

ON—VEHICLE INSPECTION

CH040-01

1. Except Delco Battery:
CHECK BATTERY ELECTROLYTE LEVEL AND VOLTAGE

- (a) Check the electrolyte quantity of each cell.
If under the lower level, replace the battery (or add distilled water if possible) and check the charging system.
- (b) Measure the battery voltage between the terminals negative (—) and positive (+) of the battery.

Standard voltage:

At 20°C (68°F): 12.7 — 12.9 V

HINT:

- Before measuring the voltage, turn the ignition switch OFF and turn off the electrical systems (headlight, blower motor, rear defogger etc.).
- If the vehicle has been running, wait 20 minutes or more after the vehicle stops before measuring the battery voltage to remove the surface charge.

If the voltage is less than the specification, charge the battery.

2. Delco Battery:

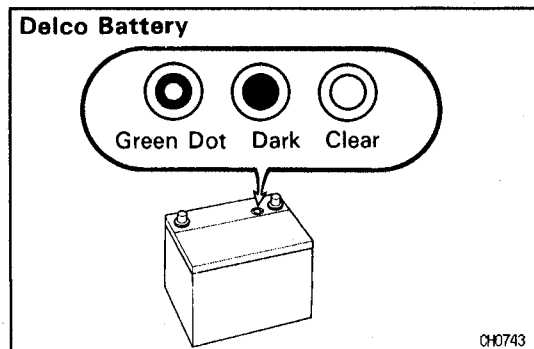
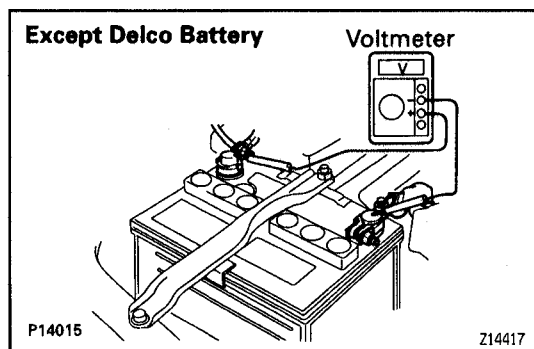
CHECK HYDROMETER

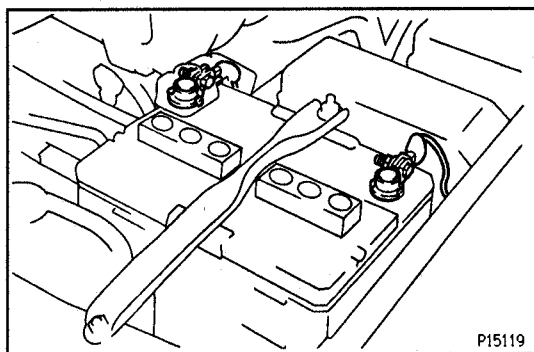
Green Dot visible: Battery is adequately charged.

Dark (Green Dot not visible): Battery must be charged.

Clear or Light Yellow: Replace battery.

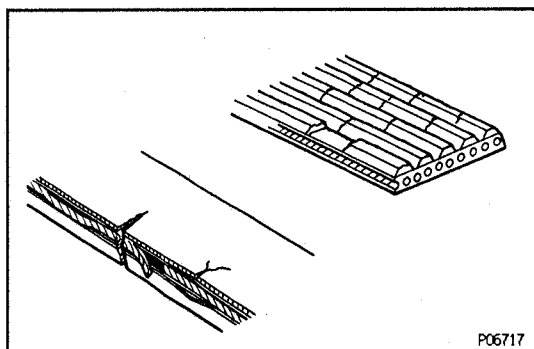
HINT: There is no need to add water during the entire service life of the battery.





3. CHECK BATTERY TERMINALS, FUSIBLE LINK AND FUSES

- (a) Check that the battery terminals are not loose or corroded.
- (b) Check the fusible link and fuses for continuity.



4. INSPECT DRIVE BELT

- (a) Visually check the belt for excessive wear, frayed cords etc.

HINT: Cracks on the ribbed side of the belt are considered acceptable.

If the belt has chunks missing from the ribs, it should be replaced.

- (b) Using a belt tension gauge, check the drive belt tension.

Belt tension gauge:

Nippondenso BTG 20 (95506—00020) or

Borroughs No. BT—33—73F

Drive belt tension:

New belt

160 ± 20 lbf

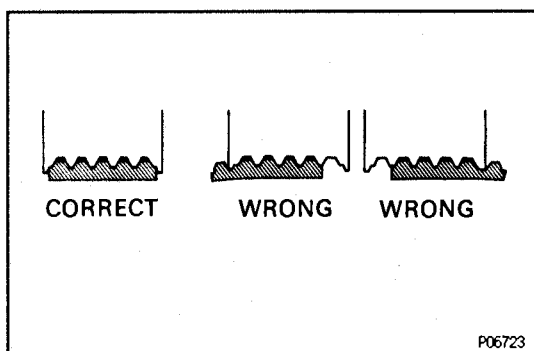
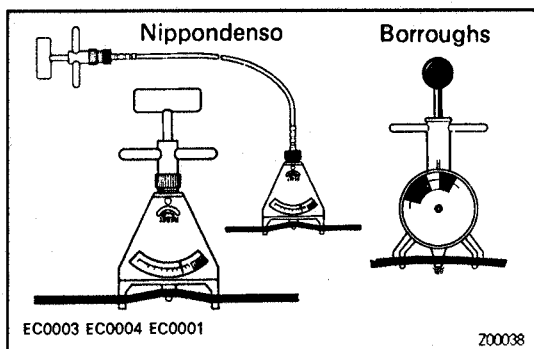
Used belt.

100 ± 20 lbf

If necessary, adjust the drive belt tension.

HINT:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing the drive belt, check that it fits properly in the ribbed grooves. Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the crank pulley.
- After installing a new belt, run the engine for approx. 5 minutes and then recheck the tension.

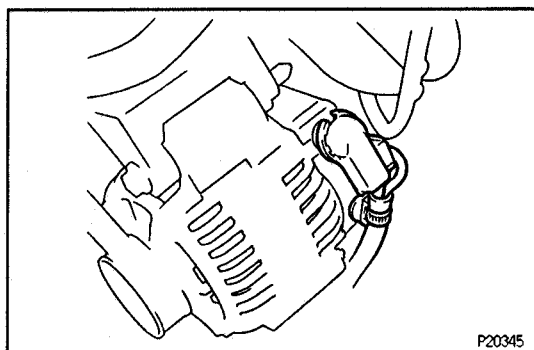


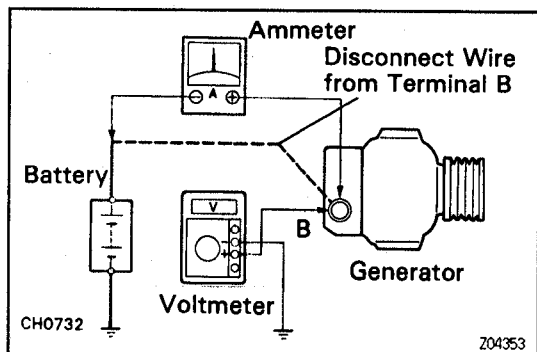
5. INSPECT FUSES FOR CONTINUITY

- ENGINE 10A
- CHARGE 7.5A
- IGN 7.5A

6. VISUALLY CHECK GENERATOR WIRING AND LISTEN FOR ABNORMAL NOISES

- (a) Check that the wiring is in good condition.
- (b) Check that there is no abnormal noise from the generator while the engine is running.





7. CHECK CHARGING CIRCUIT WITHOUT LOAD

HINT: If a battery/generator tester is available, connect the tester to the charging circuit according to the manufacturer's instructions.

- (a) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows:
 - Disconnect the wire from terminal B of the generator and connect the wire to the negative (—) terminal of the ammeter.
 - Connect the test lead from the positive (+) terminal of the ammeter to terminal B of the generator.
 - Connect the positive (+) lead of the voltmeter to terminal B of the generator.
 - Ground the negative (—) lead of the voltmeter.
- (b) Check the charging circuit as follows:
With the engine running from idling to 2,000 rpm, check the reading on the ammeter and voltmeter.

Standard amperage:

10 A or less

Standard voltage:

At 25 °C (77 °F): 14.0 — 15.0 V

At 115 °C (239 °F): 13.5 — 14.3 V

If the voltage reading is greater than the standard voltage, replace the voltage regulator.

If the voltage reading is less than the standard voltage, check the voltage regulator and generator as follows:

- With terminal F grounded, start the engine and check the voltage reading of terminal B.
- If the voltage reading is higher than the standard voltage, replace the voltage regulator.
- If the voltage reading is less than the standard voltage, repair the generator.

8. INSPECT CHARGING CIRCUIT WITH LOAD

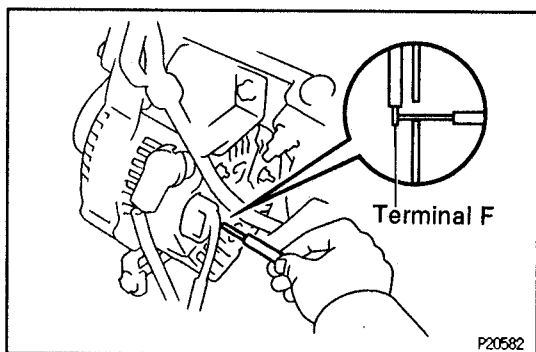
- (a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater fan control switch to HI.
- (b) Check the reading on the ammeter.

Standard amperage:

30 A or more

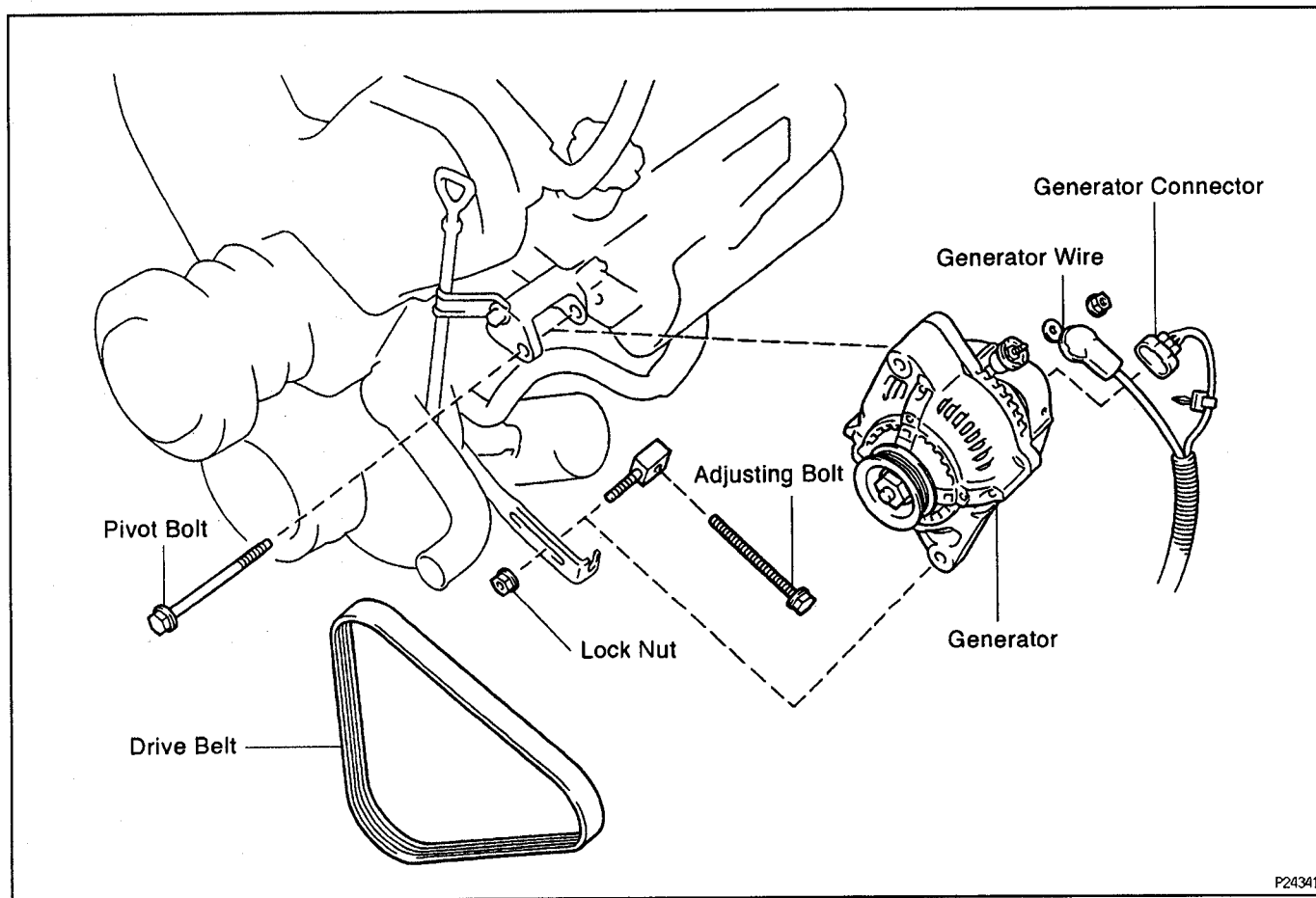
If the ammeter reading is less than 30 A, repair the generator.

HINT: If the battery is fully charged, the indication will sometimes be less than 30 A.



GENERATOR COMPONENTS FOR REMOVAL AND INSTALLATION

CH011-0X



CH09E-02

GENERATOR REMOVAL

1. DISCONNECT WIRING FROM GENERATOR

- Disconnect the connector from the generator.
- Remove the nut and disconnect the wire from the generator.

2. REMOVE GENERATOR DRIVE BELT

Loosen the adjust lock nut, adjusting bolt and pivot bolt, and remove the drive belt.

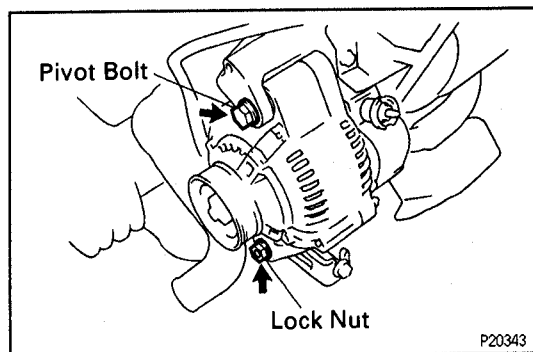
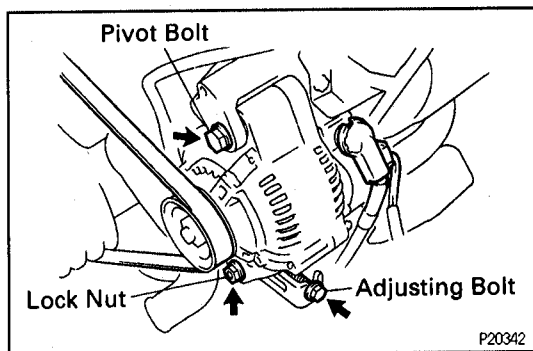
3. REMOVE GENERATOR

- Remove the pivot bolt and adjusting lock nut.
- Remove the generator.

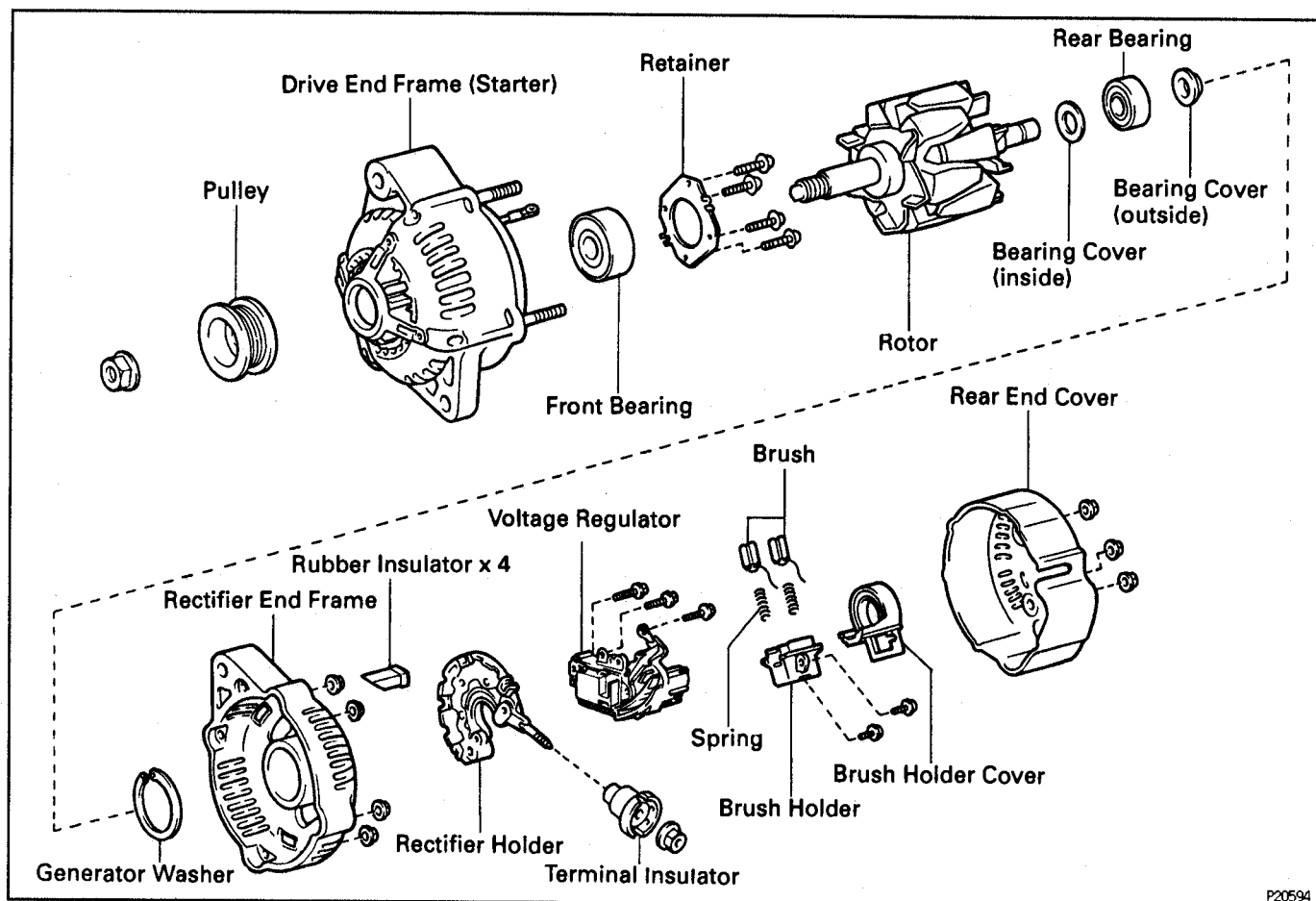
Torque:

Pivot bolt: 51 N·m (520kgf·cm, 38 ft·lbf)

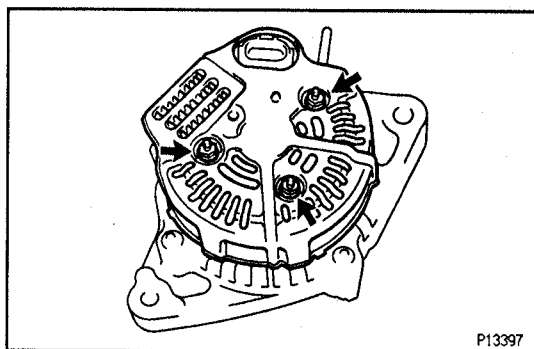
Lock Nut: 18.5 N·m (189kgf·cm, 25 ft·lbf)



COMPONENTS FOR DISASSEMBLY AND ASSEMBLY



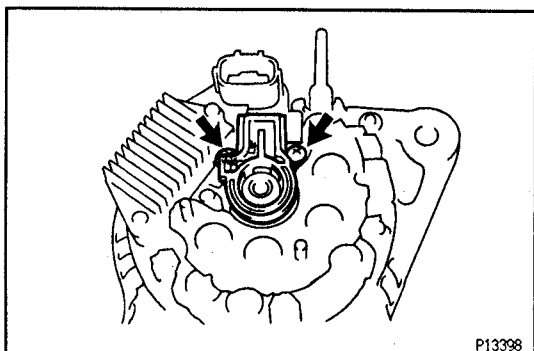
P20594



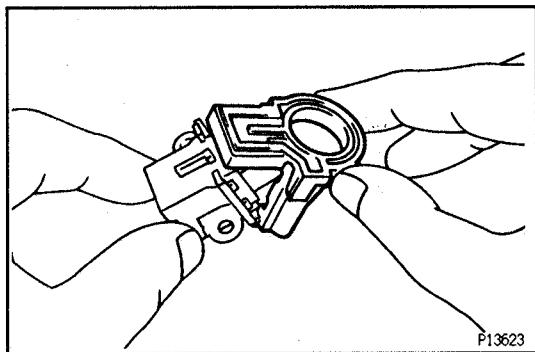
GENERATOR DISASSEMBLY

CH04P-01

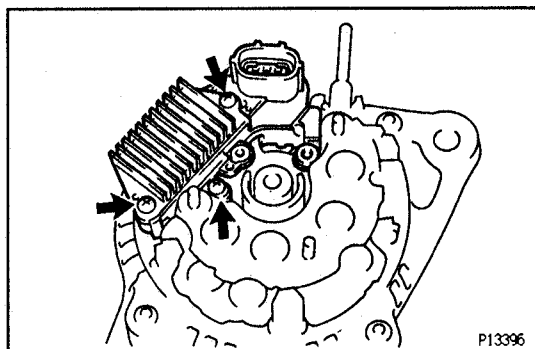
1. REMOVE REAR END COVER
 - (a) Remove the nut and terminal insulator.
 - (b) Remove the 3 nuts and end cover.



2. REMOVE BRUSH HOLDER
 - (a) Remove the 2 screws, brush holder and cover.

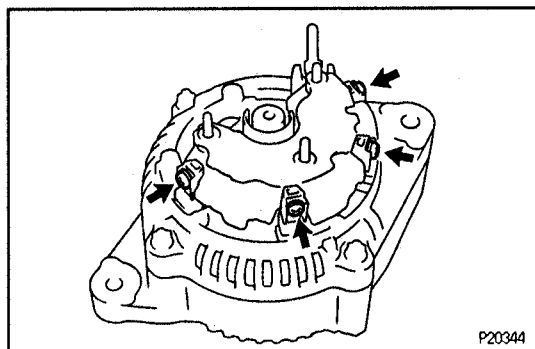


- (b) Remove the brush holder cover from the brush holder.



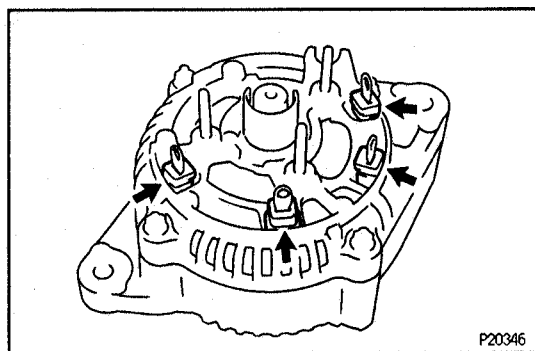
3. REMOVE VOLTAGE REGULATOR

Remove the 3 screws and voltage regulator.

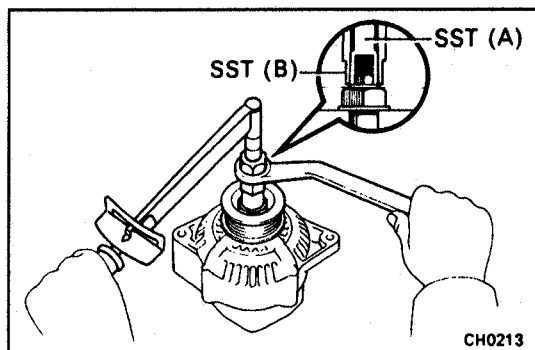


4. REMOVE RECTIFIER HOLDER

- (a) Remove the 4 screws and rectifier holder.

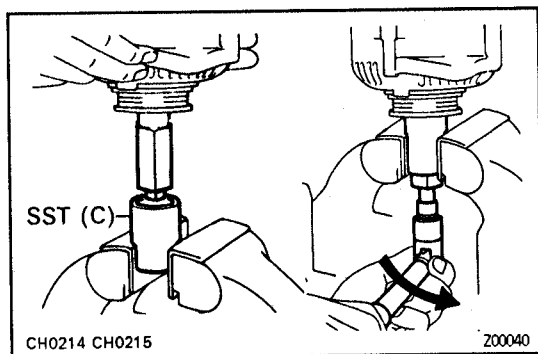


- (b) Remove the 4 rubber insulators.



5. REMOVE PULLEY

- (a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
 SST 09820—63010
 Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
- (b) Check that SST (A) is secured to the rotor shaft.



(c) As shown in the illustration, mount SST (C) in a vise, and install the generator with SST (A) and (B) to SST (C).

(d) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

NOTICE: To prevent damage to the rotor shaft, do not loosen the pulley nut more than one-half of a turn.

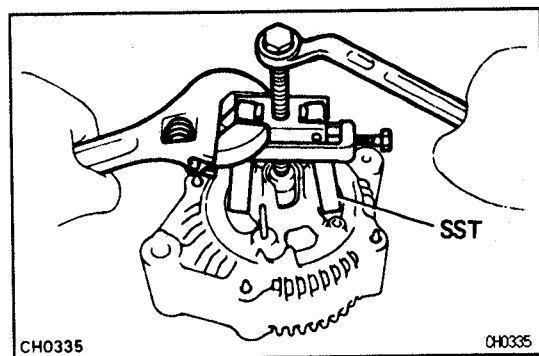
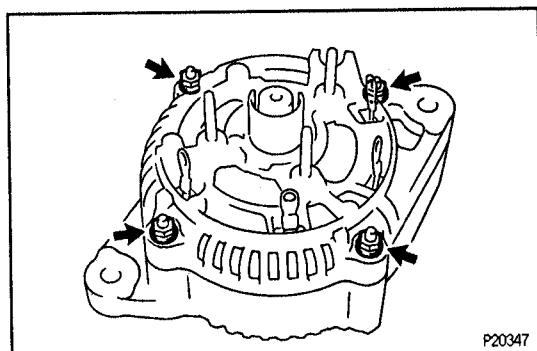
(e) Remove the generator with SST (A) and (B) from SST (C).

(f) Turn SST (B) and remove SST (A) and (B).

(g) Remove the pulley nut and pulley.

6. REMOVE RECTIFIER END FRAME

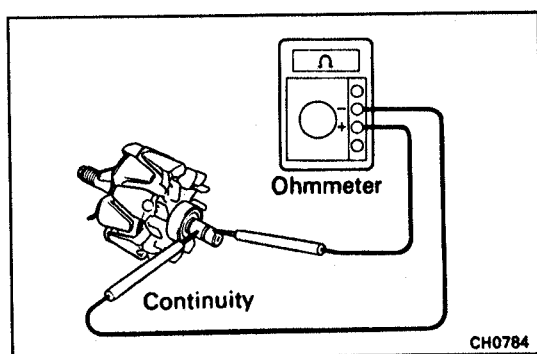
(a) Remove the 4 nuts.



(b) Using SST, remove the rectifier end frame.
SST 09286—46011

(c) Using snap ring pliers, remove the generator washer from the rectifier end frame.

7. REMOVE ROTOR FROM DRIVE END FRAME



GENERATOR INSPECTION AND REPAIR

Rotor

1. INSPECT ROTOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance:

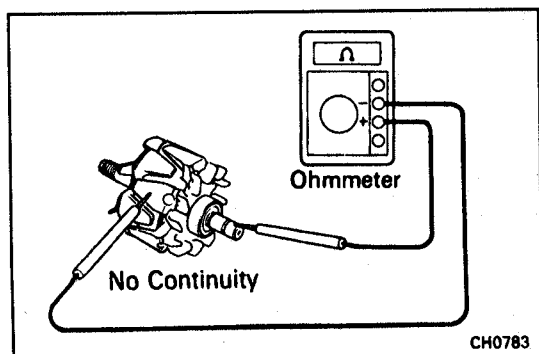
At 20°C (68°F): 2.8 — 3.0 Ω

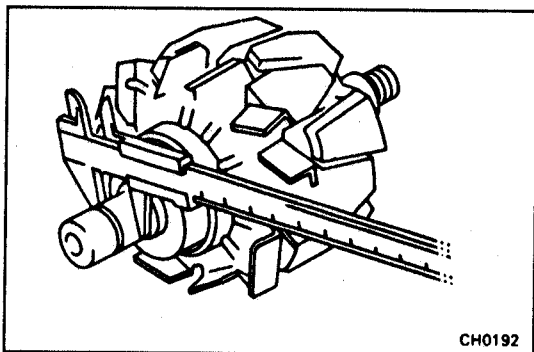
If there is no continuity, replace the rotor.

2. INSPECT ROTOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the slip ring and rotor.

If there is continuity, replace the rotor.





3. INSPECT SLIP RINGS

- Check that the slip rings are not rough or scored. If rough or scored, replace the rotor.
- Using vernier calipers, measure the slip ring diameters.

Standard diameter:

14.2 – 14.4 mm (0.559 – 0.567 in.)

Minimum diameter:

12.8 mm (0.504 in.)

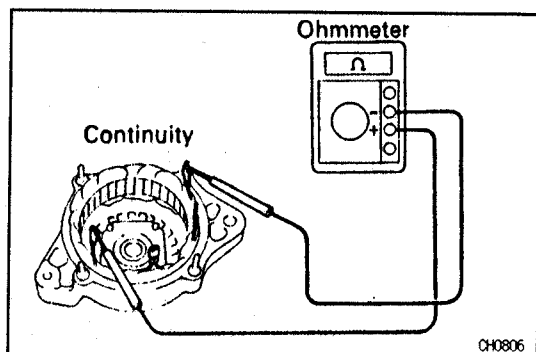
If the diameter is less than the minimum, replace the rotor.

Stator (Drive End Frame)

1. INSPECT STATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the coil leads.

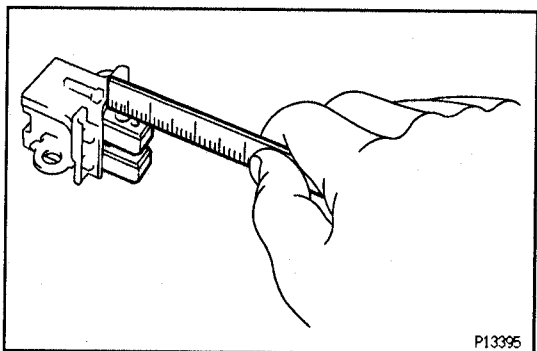
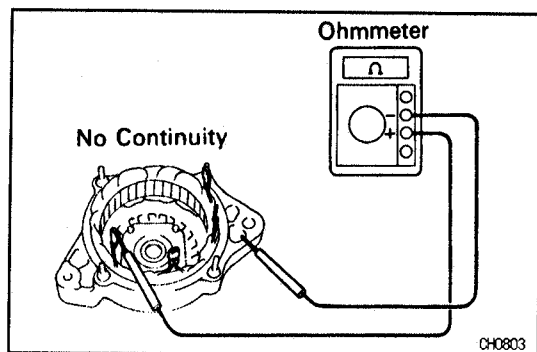
If there is no continuity, replace the drive end frame assembly.



2. INSPECT STATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the coil leads and drive end frame.

If there is continuity, replace the drive end frame assembly.



Brushes

1. INSPECT EXPOSED BRUSH LENGTH

Using a scale, measure the exposed brush length.

Standard exposed length:

10.5 mm (0.413 in.)

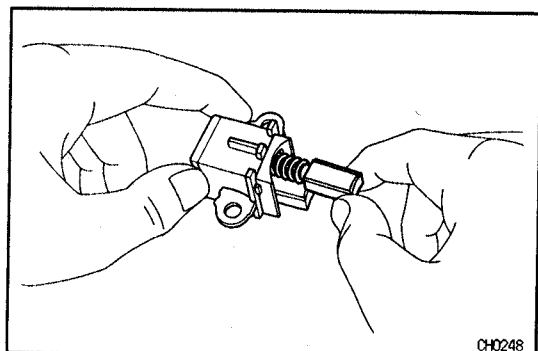
Minimum exposed length:

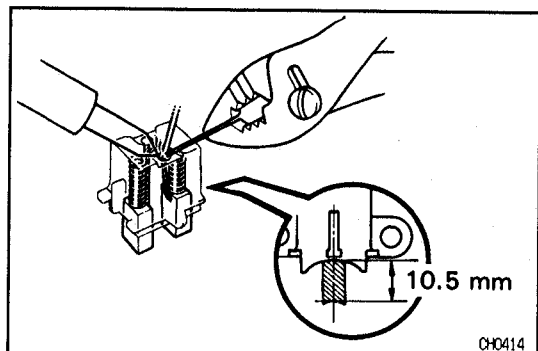
1.5 mm (0.059 in.)

If the exposed length is less than the minimum, replace the brushes.

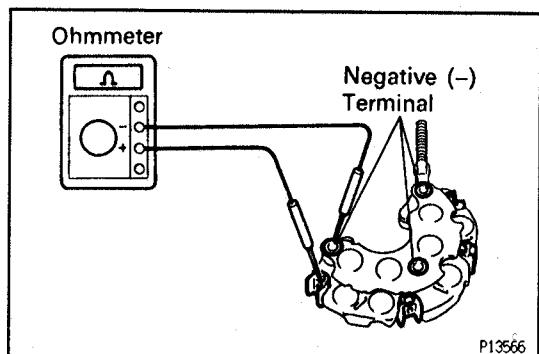
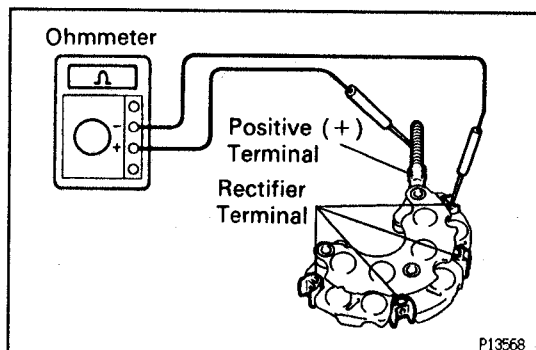
2. IF NECESSARY, REPLACE BRUSHES

- Unsolder and remove the brush and spring.
- Run the wire of the brush through the hole in the brush holder, and insert the spring and brush into the brush holder.





- (c) Solder the brush wire to the brush holder at the exposed length.
Exposed length:
10.5 mm (0.413 in.)
- (d) Check that the brush moves smoothly in the brush holder.
- (e) Cut off the excess wire.
- (f) Apply insulation paint to the soldered point.



Rectifiers (Rectifier Holder)

1. INSPECT POSITIVE RECTIFIER

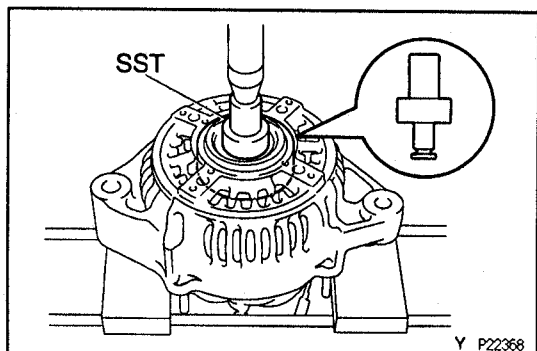
- (a) Using an ohmmeter, connect one tester probe to the positive (+) terminal and the other to each rectifier terminal.
- (b) Reverse the polarity of the tester probes and repeat step (a).
- (c) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.

2. INSPECT NEGATIVE RECTIFIER

- (a) Using an ohmmeter, connect one tester probe to each negative (-) terminal and the other to each rectifier terminal.
- (b) Reverse the polarity of the tester probes and repeat step (a).
- (c) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.



Bearings

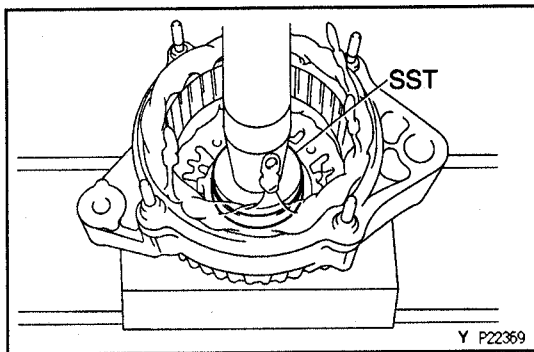
1. INSPECT FRONT BEARING

Check that the bearing is not rough or worn.

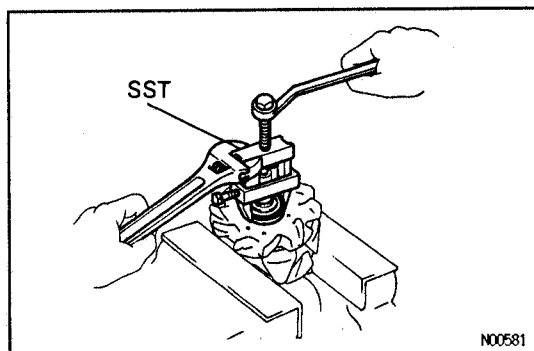
2. IF NECESSARY, REPLACE FRONT BEARING

- (a) Remove the 4 screws and bearing retainer.
- (b) Using a press and socket wrench, press out the front bearing.

SST 09950—60010 (09951—00260, 09952—06010)



- (c) Using SST and a press, press the front bearing into the drive end frame.
SST 09950—60010 (09951—00500)
- (d) Install the bearing retainer with the 4 screws.

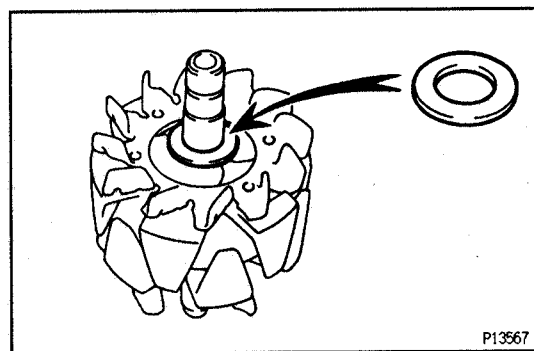


3. INSPECT REAR BEARING

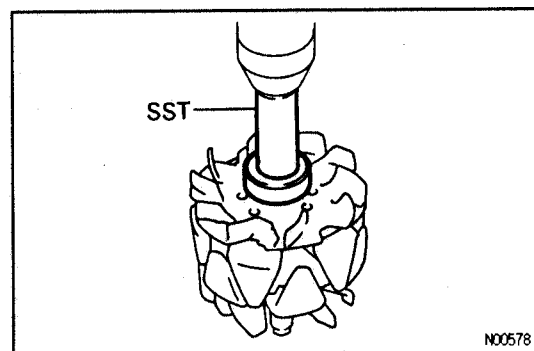
Check that the bearing is not rough or worn.

4. IF NECESSARY, REPLACE REAR BEARING

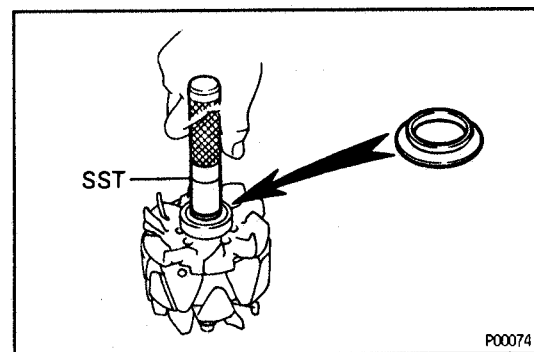
- (a) Using SST, remove the bearing cover and bearing.
SST 09820—00021
- (b) Remove the bearing cover (inside).



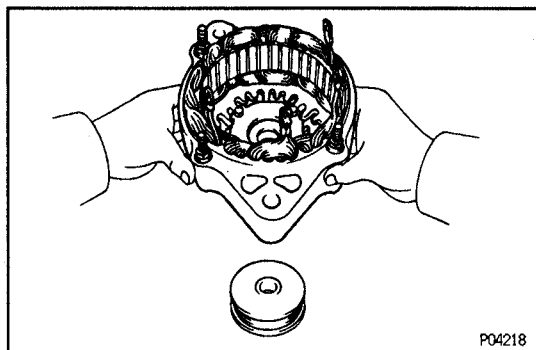
- (c) Place the bearing cover (inside) on the rotor.



- (d) Using SST and a press, press in a new bearing and the bearing cover.
SST 09820—00030

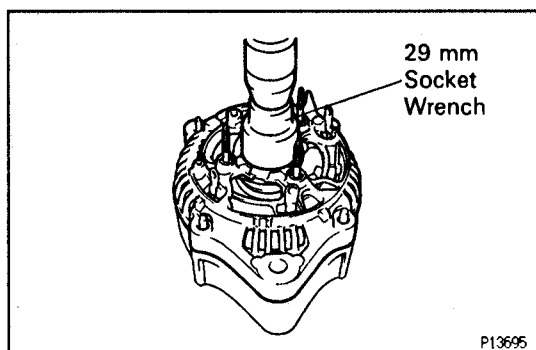


- (e) Using SST, push in the bearing cover (outside).
SST 09285—76010



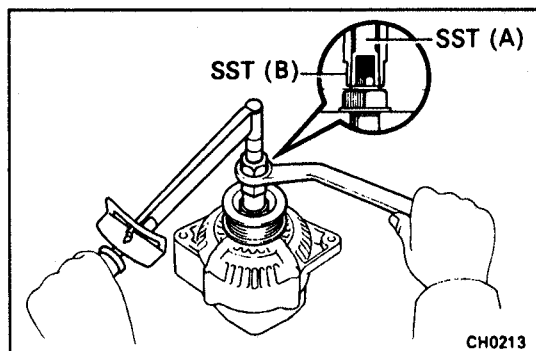
GENERATOR ASSEMBLY

1. PLACE RECTIFIER END FRAME ON PULLEY
2. INSTALL ROTOR TO DRIVE END FRAME



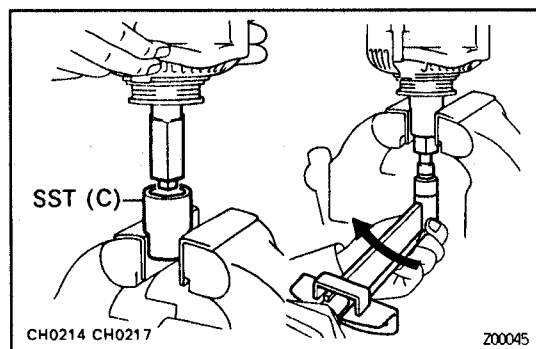
3. INSTALL RECTIFIER END FRAME

- (a) Install the generator washer to the rectifier end frame.
NOTICE: Be careful of the generator washer installation direction.
- (b) Using a 29 mm socket wrench and press, slowly press in the rectifier end frame.
- (c) Install the 4 nuts.
Torque: 4.5 N·m (45 kgf·cm, 39 in.-lbf)



4. INSTALL PULLEY

- (a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.
- (b) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
SST 09820-63010
Torque: 39 N·m (400 kgf·cm, 29 ft-lbf)
- (c) Check that SST (A) is secured to the pulley shaft.
- (d) As shown in the illustration, mount SST (C) in a vise, and install the generator with SST (A) and (B) to SST (C).
- (e) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.
Torque: 110 N·m (1,125 kgf·cm, 81 ft-lbf)
- (f) Remove the generator with SST (A) and (B) from SST (C).
- (g) Turn SST (B) and remove SST (A) and (B).



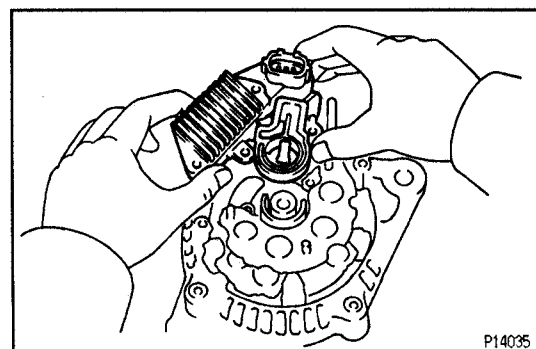
5. INSTALL RECTIFIER HOLDER

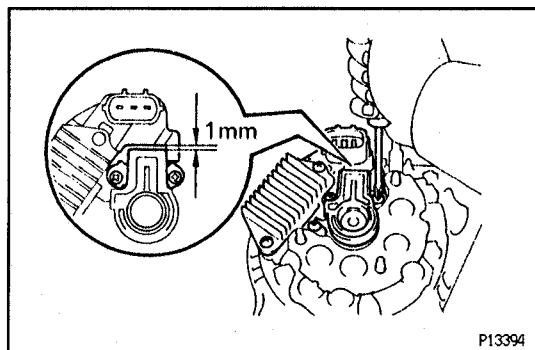
- (a) Install the 4 rubber insulators on the lead wires.
- (b) Install the rectifier with the 4 screws.
Torque: 2.0 N·m (20 kgf·cm, 18 in.-lbf)

6. INSTALL BRUSH HOLDER AND VOLTAGE REGULATOR

- (a) Place the brush holder cover to the brush holder.
- (b) Install the voltage regulator and brush holder to the rear end frame horizontally as shown in the illustration.

HINT: Check that the brush holder's cover doesn't slip to one side during installation.





- (c) Tighten the 5 screws until there is a clearance of at least 1 mm (0.04 in.) between the brush holder cover and connector.

7. INSTALL REAR END COVER

- (a) Install the end cover with the 3 nuts.
Torque: 4.5 N·m (45 kgf·cm, 39 in.-lbf)
- (b) Install the terminal insulator with the nut.
Torque: 4.1 N·m (42 kgf·cm, 36 in.-lbf)

8. MAKE SURE ROTOR ROTATES SMOOTHLY

GENERATOR INSTALLATION

CH0A8-01

Installation is in the reverse order of removal.

CH

SERVICE SPECIFICATIONS

SERVICE DATA

CH03E-07

Battery	Voltage	at 20°C (68°F)	12.7 — 12.9 V
Drive belt	Tension	New belt	160 ± 20
		Used belt	100 ± 20
Generator	Rated output ampere		12 V — 60 A
	Rotor coil resistance	at 20°C (68°F)	10.5 mm (0.413 in.)
	Slip ring diameter	STD	1.5 mm (0.059 in.)
		Minimum	2.8 — 3.0 Ω
	Brush exposed length	STD	14.2 — 14.4 mm (0.559 — 0.567 in.)
		Minimum	12.8 mm (0.504 in.)
Generator regulator	Regulating voltage	at 25°C (77°F)	14.0 — 15.0 V
		at 115°C (239°F)	13.5 — 14.3 V

CH03F-08

TORQUE SPECIFICATIONS

Part tightened	N·m	kgf·cm	ft·lbf
Generator x Generator bracket	51	520	38
Generator x Adjusting lever	18.5	189	25
Rectifier end frame x Drive end frame	4.5	45	39 in.-lbf
Generator pulley x Rotor	110	1,125	81
Drive end frame x Voltage regulator	2.0	20	17 in.-lbf
Generator rear end cover x Rectifier end frame	4.5	45	39 in.-lbf
Terminal insulator x Rectifier Holder	4.1	42	36 in.-lbf