
DAIHATSU

TERIOS

J100

CHARGING SYSTEM

CH

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OUTLINE OF CHARGING SYSTEM

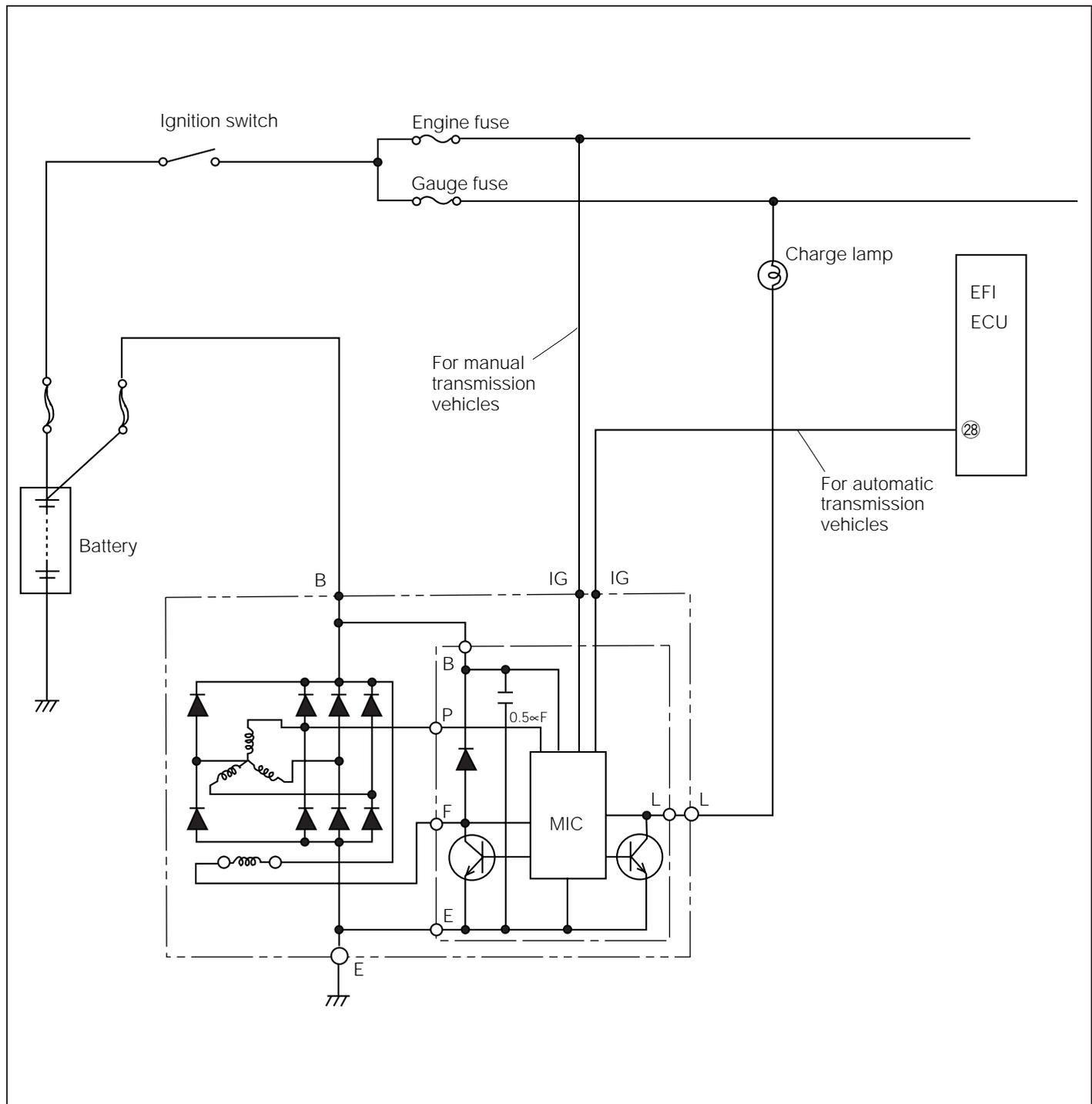
An IC regulator type alternator is employed on this model.

Moreover, an alternator cut-off system is adopted on automatic transmission vehicles to shut off the alternator operation so that the startability of the engine may be enhanced when the ambient temperature is extremely low at the starting period.

This system is controlled by the EFI ECU.

JCH00002-00000

CHARGING SYSTEM CIRCUIT



JCH00003-00001

PRECAUTIONS

1. Prior to the inspection, make sure that the battery cables are connected securely.
2. When a quick charging operation is carried out, first be sure to disconnect the battery cables.
3. Never use a high-voltage insulation resistance tester for the purpose of conducting this inspection.
4. Under no circumstances should the battery cables be disconnected while the engine is rotating.

JCH00004-00000

IN-VEHICLE INSPECTION

1. Inspection of battery

<Reference>

- First-aid treatment for dilute sulfuric acid

Nature of accident	First-aid treatment
Acid gets to vehicle body.	Immediately flush the affected area using a large amount of clean running water, until no acid content remains any more.
* Acid gets into your eyes.	Immediately flush your eyes using a large amount of clean running water for at least 15 minutes with your eyes in open state.
* Acid gets to your skin or clothes.	Immediately flush the affected area using a large amount of clean running water, until no acid content remains any more. Afterwards, neutralize them with a soap. Finally flush them with water.
Acid is spilled.	Immediately flush the affected area using a large amount of water, until no acid content remains any more. Afterwards, neutralize the area with slacked lime, sodium or the like.
* Acid is swallowed.	Immediately flush the mouth with clean water. Let him drink raw eggs. Milk or a large amount of water. Let him lie quietly.

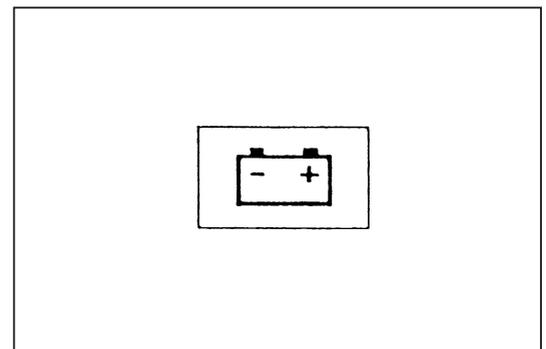
* After the aforesaid first-aid treatment has been done, call a physician immediately.

JCH00005-00000

2. Inspection of drive belt
(Refer to the MA section of the service manual.)
3. Check of fuses for continuity
 - Fusible link
 - Fusible link block
 - EFI No. 1 fuse
 - Engine fuse
 - Gauge fuse
4. Checking alternator wiring and listening for abnormal noises
 - (1) Check to see if the alternator wire is connected properly to the alternator.
 - (2) Ensure that the alternator emits no abnormal noise while the engine is running.
5. Check of charge warning lamp circuit
 - (1) Turn OFF all accessory switches.
 - (2) Start the engine and warm up the engine thoroughly. Turn OFF the ignition switch.
 - (3) When the ignition switch is turned ON, ensure that the charge warning lamp goes on.
 - (4) After the engine has started, ensure that the charge warning lamp goes out.

If the warning lamp does not function as specified, troubleshoot the warning lamp circuit.

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JCH00007-00002

6. Check of charging circuit under unloaded state

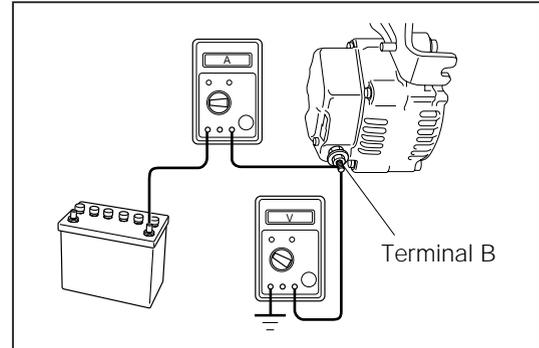
NOTE:

- If a battery/alternator tester is available, connect such tester to the charging circuit according to the manufacturer's instructions of the alternator tester.

JCH00008-00000

(1) If a battery/alternator tester is not available, connect a voltmeter and an ammeter to the alternator wiring and alternator as follows:

- Disconnect the battery ground cable from the negative (-) terminal of the battery.
- Connect an ammeter in series between the alternator wire terminal B and the alternator as indicated in the right figure.
- Connect the positive (+) terminal of a voltmeter to the terminal B of the alternator as indicated in the right figure.
- Connect the negative (-) terminal of the voltmeter to the engine ground.
- Wind vinyl tape around each connection section so as to prevent short.
- Reconnect the battery ground cable to the negative terminal of the battery.



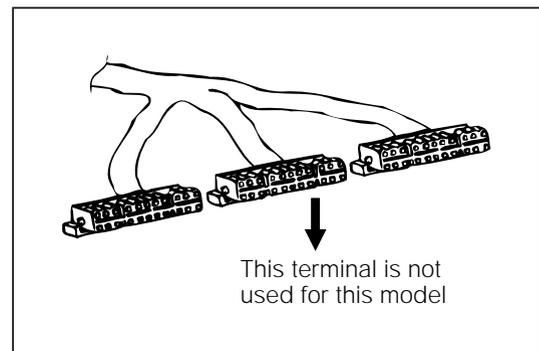
JCH00009-00003

(2) Connection of SST

Install the following SST between EFI ECU and EFI ECU connectors of the engine wire.

(Refer to the EF section of the service manual for installation of the SST.)

SST: 09842-87706-000



JCH00010-00004

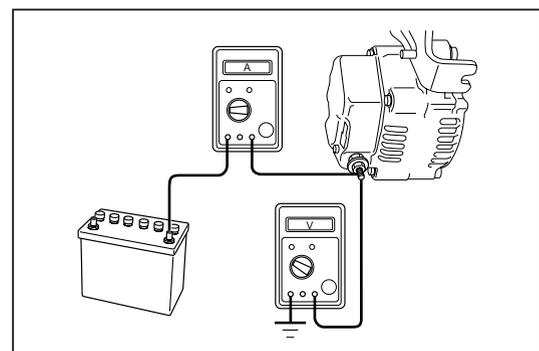
(3) Checking the charging circuit as follows:

- ① Start the engine and warm it up.
- ② Raise the engine speed from the idle speed to 2000 rpm.
- ③ Ensure that the ammeter and voltmeter reading are within the specified value.

Standard Amperage: Not to exceed 10 A.

Standard Voltage: 13.6 - 14.4 Volts

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



JCH00011-00005

For automatic transmission models, ensure that a voltage of 4.0 volts or higher is applied to between the terminal ⑳ of the SST and the body ground.
If the specified voltage is not applied, check the wiring between the EFI ECU and the alternator as follows:

- a. Turn OFF the ignition switch.
- b. Disconnect the battery ground cable terminal from the negative terminal of the battery.
- c. Disconnect the EFI ECU terminal of the SST from the EFI ECU. (Do not disconnect the engine wire side connector of the SST.)
- d. Connect the battery ground cable terminal to the negative terminal of the battery.
- e. Turn ON the ignition switch.
- f. Ensure that a voltage of 4.0 volts or higher is applied to between the terminal ⑳ of the SST and the body ground.

If the voltage between the terminal ⑳ of the SST and the body ground is 2.5 volts or less, check the EFI computer and its related circuits for short or open circuit.

<Reference>

The standard voltage between the terminal ⑳ of the SST and the body ground is approximately equal to the battery voltage.

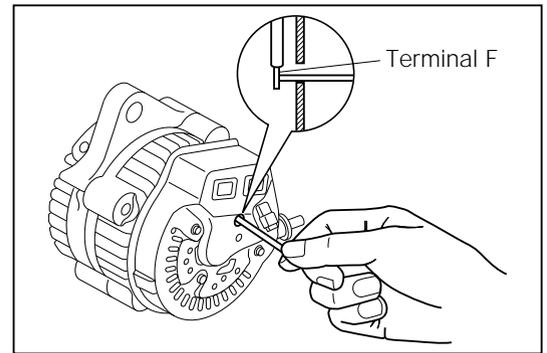
7. Check of charging circuit under loaded state
 - (1) Start the engine. Maintain the engine speed at 2000 rpm. Turn ON the high beams of the headlamps and set the blower fan motor switch to the Hi position. Take a reading of the ammeter.

Standard Amperage: 30 A or more

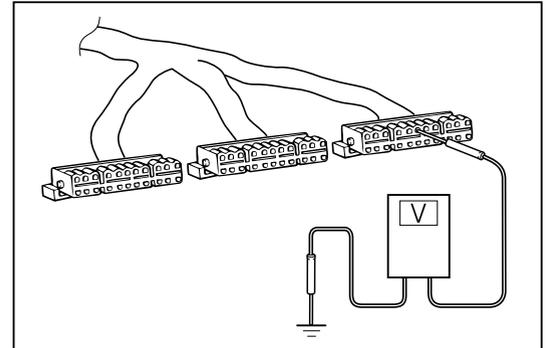
If the ammeter reading is less than 30 A, repair the alternator.
(Refer to the overhaul of the alternator.)

NOTE:

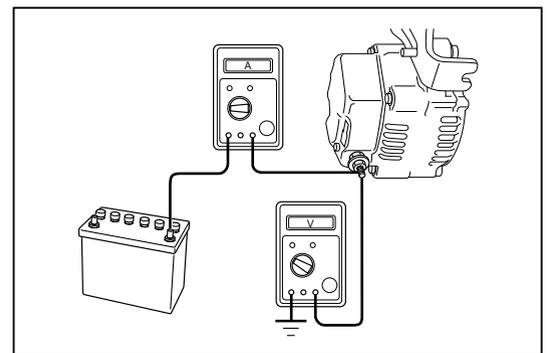
- When the battery is in a fully-charged state, the ammeter reading may be less than 30 A during the aforesaid test.



JCH00012-00006



JGCH00013-00007



JCH00014-00008

CH-6

Removal of battery

WARNING:

- Never touch the battery terminals immediately after the engine stopped.
- Be certain to turn OFF the ignition switch.
- Never allow any fire to be brought near the battery.

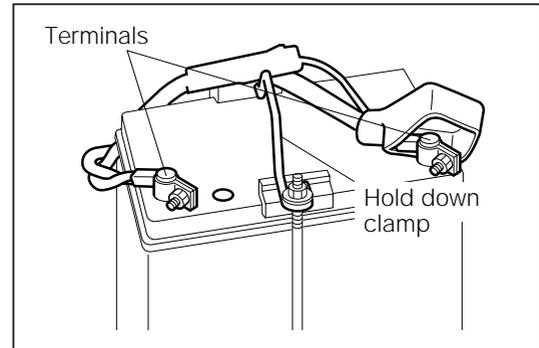
CAUTION:

- Be very careful not to drop the battery or apply strong vibration to the battery.

1. Ensure that the ignition switch is turned OFF.
2. Disconnect the battery ground cable from the negative terminal of the battery.
3. Disconnect the positive cable terminal from the positive terminal of the battery.
4. Remove the battery hold-down clamp.

5. Remove the battery.

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JCH00016-00009

JCH00017-00000

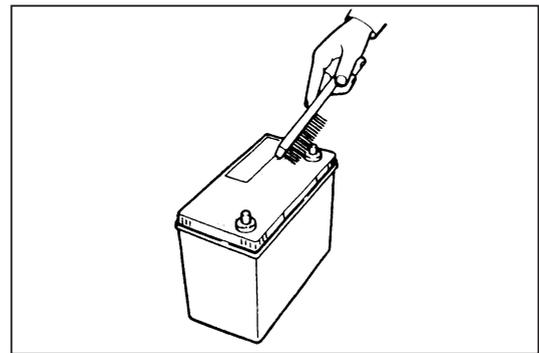
CLEANING AND INSPECTION OF BATTERY

1. Remove any rust from the battery terminals by means of a wire brush, a fine abrasive paper, or sodium water and a soft brush.

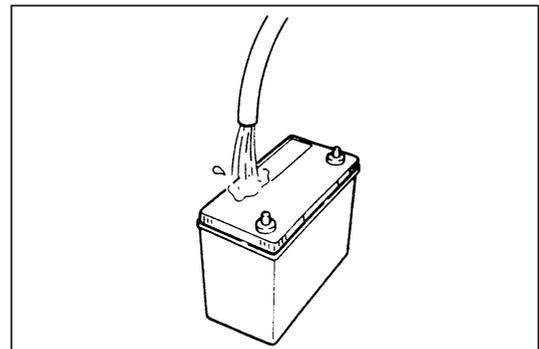
NOTE:

- After the battery terminals have been cleaned, make sure that no rust particle remains on the terminals.

2. Using adhesive tape or the like, seal the vent hole of each cell plug.
3. Flush the battery with clean water, using a soft brush.
4. Wipe off the battery surface using a cloth dampened with clean water.
5. Dry the battery case surface.



JCH00018-00010



JCH00019-00011

Battery capacity check

1. Reserve capacity check, using hydrometer
2. Reserve capacity check, using battery tester

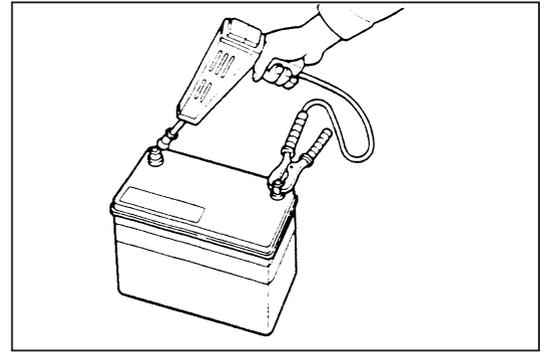
CAUTION:

- The battery tester should be operated in accordance with the operating instructions of the service manual.
- The battery to be check should be fully charged.

- (1) Connect a battery tester to the battery.
- (2) Check the battery capacity.

NOTE:

- If the check results are not satisfactory, recheck the reserve capacity, after having checked the electrolyte level and/or replenished distilled water. Then, charge the battery until the battery capacity reaches the specified level.
- Replace the battery with a new one, if the check results are still unsatisfactory after the rechecking of the battery reserve capacity.



JCH00020-00012

Battery recharging (Except Delco freedom battery)

CAUTION:

- If the Delco Freedom Battery requires the recharging, be sure to consult with the distributor or agent of Delco Freedom Battery.

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INSTALLATION OF BATTERY

1. Clean any dust from the battery carrier.

2. Place the battery on the battery carrier in such a direction that the negative terminal of the battery may come at the front side of the vehicle.

3. Install the battery hold-down clamp.

CAUTION:

- Be very careful not to tighten the hold-down clamp excessively.

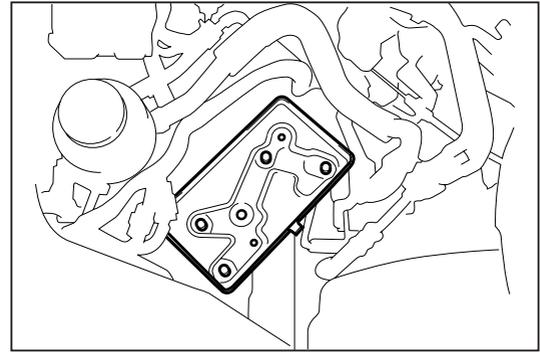
NOTE:

- Install the battery hold-down clamp in such a direction that the hold-down clamp on the battery may come to the straight position against the battery not in a tilted state.

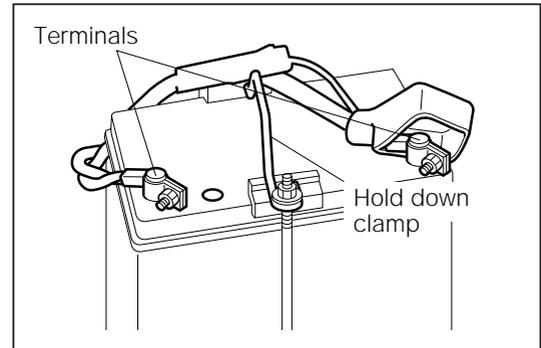
4. Connect the positive cable terminal to the battery positive terminal of the battery.

NOTE:

- Ensure that the terminal at the wiring exhibits no rust or the like.
- If any rust is present, remove the rust, using a wire brush or a fine abrasive paper.

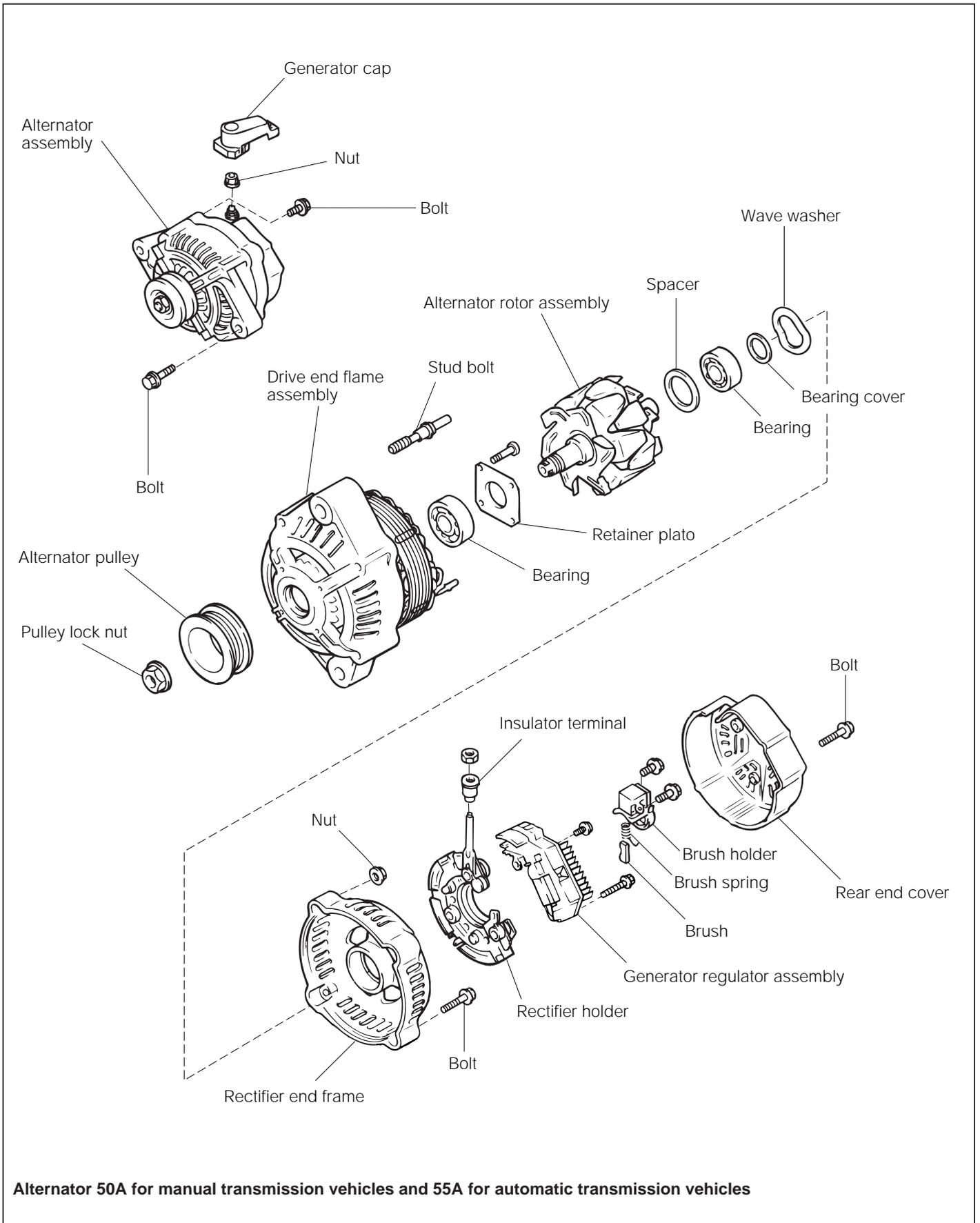


JCH00021-00013



JCH00022-00014

ALTERNATOR COMPONENTS



Alternator 50A for manual transmission vehicles and 55A for automatic transmission vehicles

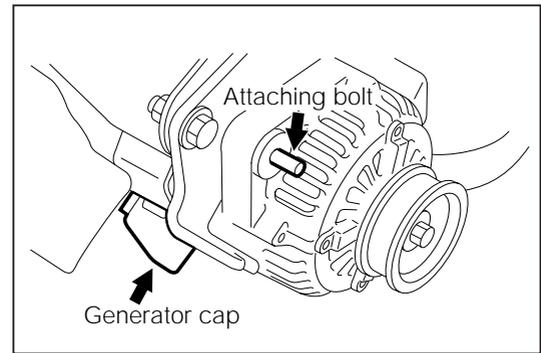
CH-10

REMOVAL OF ALTERNATOR

1. Disconnect the ground cable terminal from the negative terminal of the battery.
2. Remove the generator cap.
3. Disconnect the terminal B of the alternator wire from the alternator.
4. Disconnect the alternator connector of the alternator wire from the alternator.

NOTE:

- Be sure to disengage the lock of the connector before disconnection.



JCH00024-00016

5. Removal of alternator drive belt
 - (1) Remove the air conditioner drive belt.
(Refer to the air conditioner installation manual issued by DENSO CO., LTD.)
 - (2) Remove the upper attaching bolt of alternator.

- (3) Remove the engine undercover.

JCH00025-00017

- (4) Remove the lower attaching bolt of the alternator.
- (5) Take out the alternator from the vehicle.

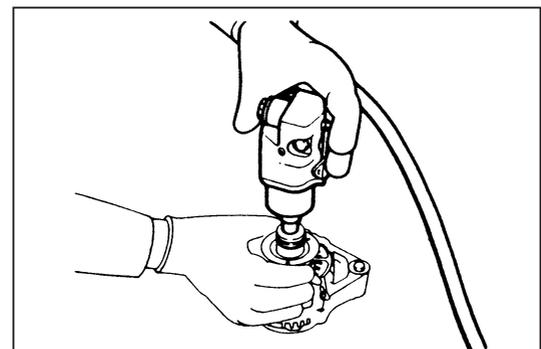
JCH00026-00000

DISASSEMBLY OF ALTERNATOR

1. Remove the alternator pulley lock nut by means of an impact wrench.

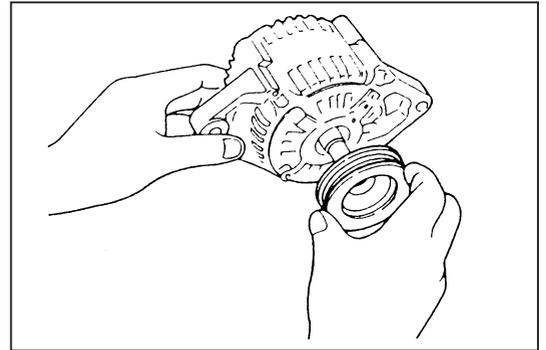
NOTE:

- Be sure to use an impact wrench having a hexagonal hole.



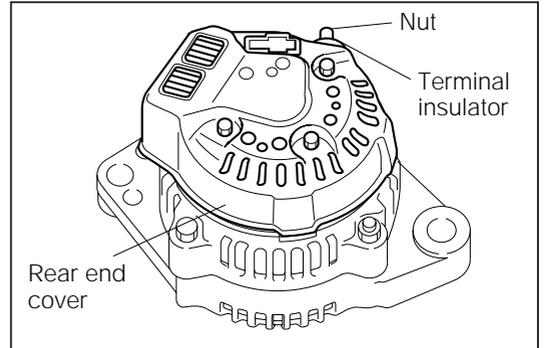
JCH00027-00018

2. Remove the alternator pulley.



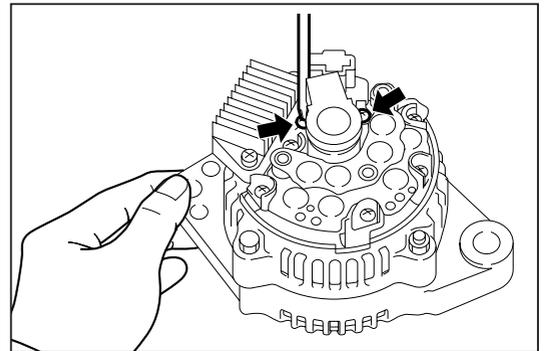
JCH00028-00019

3. Remove the attaching nut of the terminal insulator.
4. Pull out the terminal insulator.
5. Remove the three rear end cover attaching nuts.
6. Remove the terminal plate attaching bolt.
7. Remove the rear end cover.



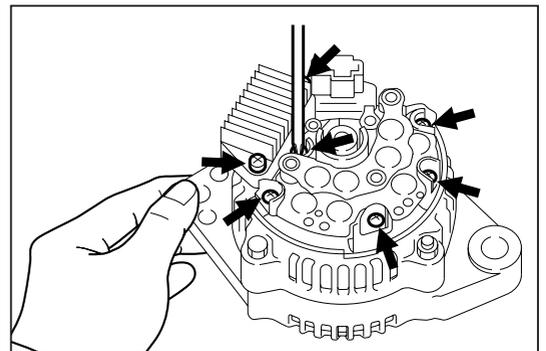
JCH00029-00020

8. Remove the brush holder by removing the two attaching bolts.



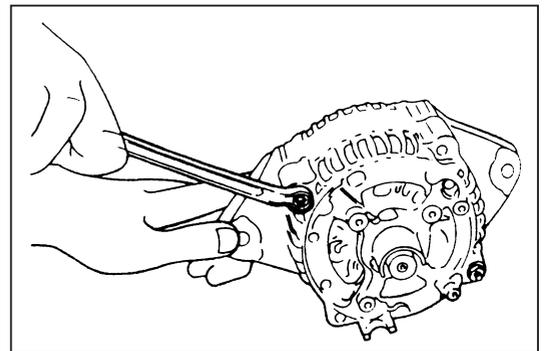
JCH00030-00021

9. Remove the rectifier holder and regulator assembly attaching bolts.
10. Remove the regulator assembly.
11. Remove the rectifier holder.



JCH00031-00022

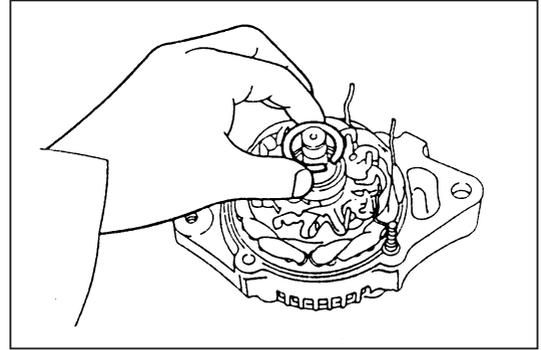
12. Remove the rectifier end frame assembly by removing the four attaching nuts or two bolts and two nuts.



JCH00032-00023

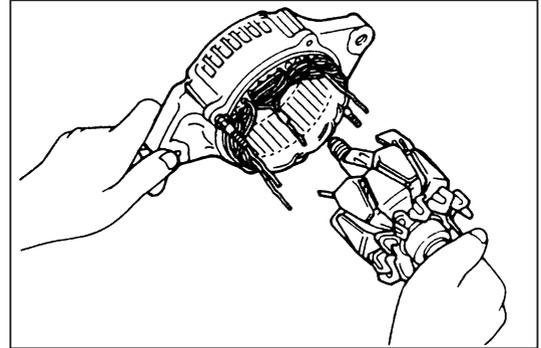
CH-12

13. Remove the wave washer from the alternator rotor assembly.



JCH00033-00024

14. Remove the alternator rotor assembly from the drive end frame assembly.



JCH00034-00025

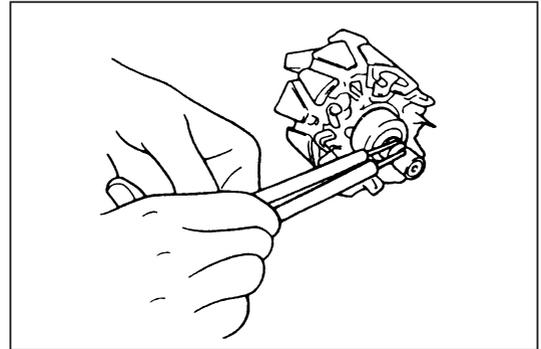
INSPECTION OF ALTERNATOR

Rotor

1. Inspection of rotor for open circuit
Using an ohmmeter, check to see if the specified resistance exists between the rotor slip rings.

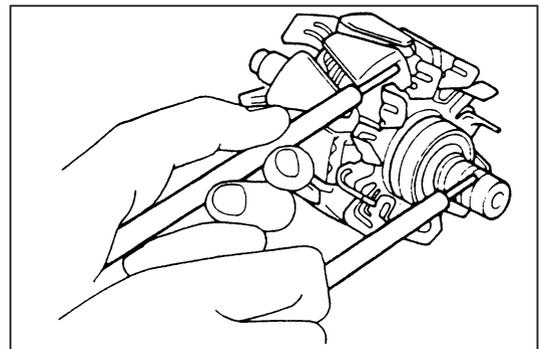
Standard Resistance: 2.9 ± 0.2 ohm

If the resistance does not conform to the specification, replace the rotor.



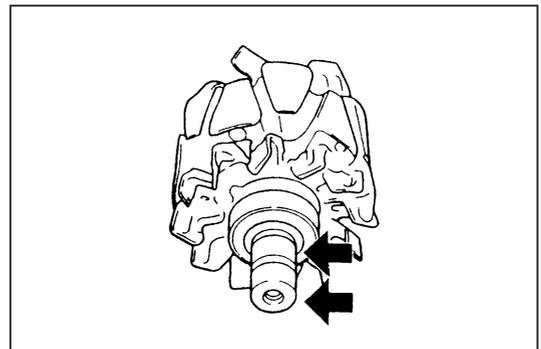
JCH00035-00026

2. Inspection of rotor for ground
Ensure that no continuity exists between the rotor slip rings and the rotor core.
If continuity exists, replace the rotor.



JCH00036-00027

3. Inspection of slip rings
(1) Check to see if the slip ring surface exhibits roughness, abnormal wear and/or burning.
Replace the rotor, if necessary.



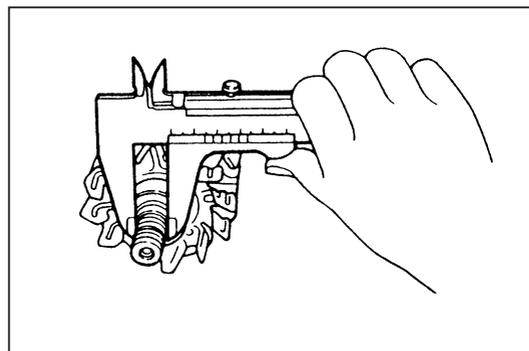
JCH00037-00028

- (2) Measure the outer diameter of the slip ring, using vernier calipers.

Standard Diameter: 14.4 mm

Minimum Diameter: 14.0 mm

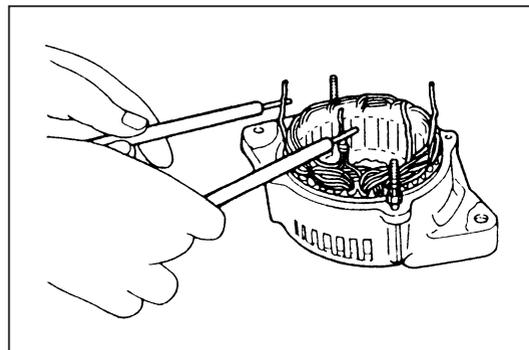
If the slip ring diameter is less than the minimum diameter, replace the rotor assembly.



JCH00038-00029

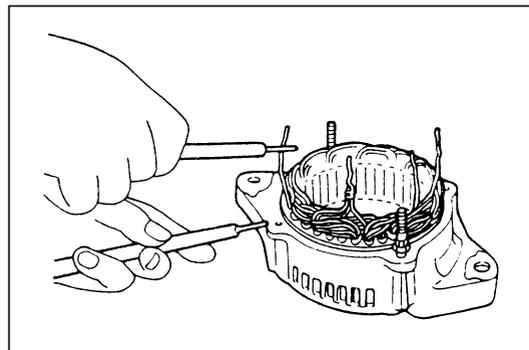
Stator

1. Inspection of stator for open circuit
Using an ohmmeter, check to see if any open circuit of the stator coil is present between the leads.
If no continuity exists, replace the end frame assembly.



JCH00039-00030

2. Inspection of stator for short circuit
Using an ohmmeter, check to see if any short circuit of the stator coil is present between the coil lead and the drive end frame.
If continuity exists, replace the drive end frame assembly.



JCH00040-00031

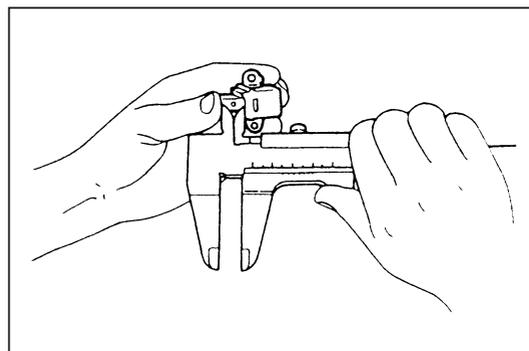
Brush and brush holder

1. Measurement of exposed brush length
Measure the exposed brush length, using a scale.

Standard Exposed Length: 10.5 mm

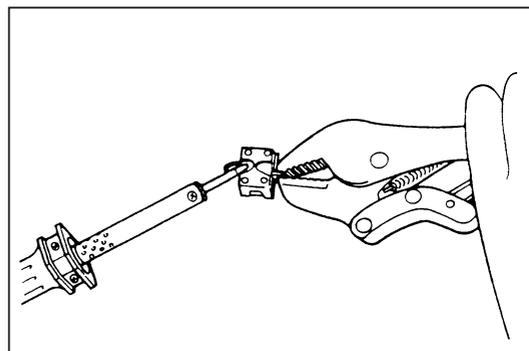
Minimum Exposed Length: 8.4 mm

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



JCH00041-00032

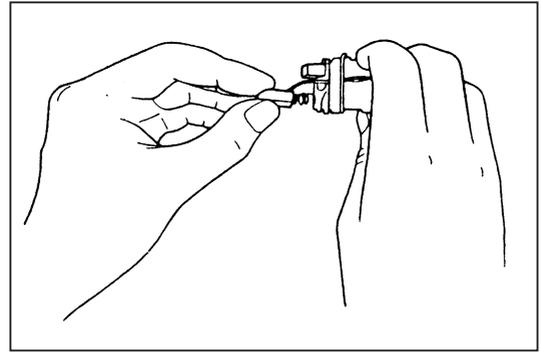
2. Replacement of brushes (If necessary)
 - (1) Remove the brush and spring from the brush holder by melting the solder by means of a soldering iron.



JCH00042-00033

CH-14

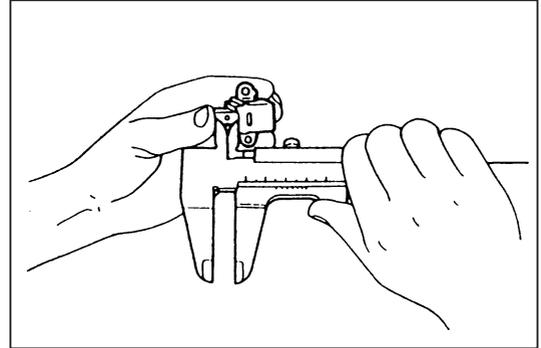
- (2) Install the brush cord in the brush holder with the spring fitted in place.



JCH00043-00034

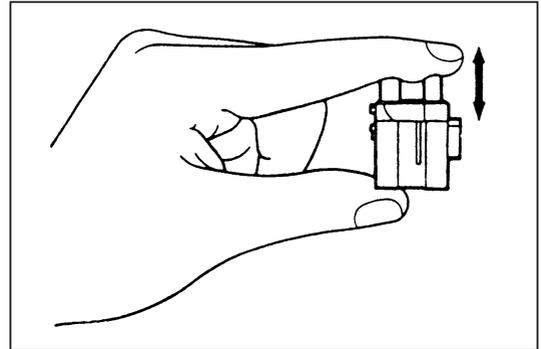
- (3) Solder the brush cord in the brush holder in such a way that the exposed length of the brush meets the specification.

Standard Exposed Length: 10.5 mm



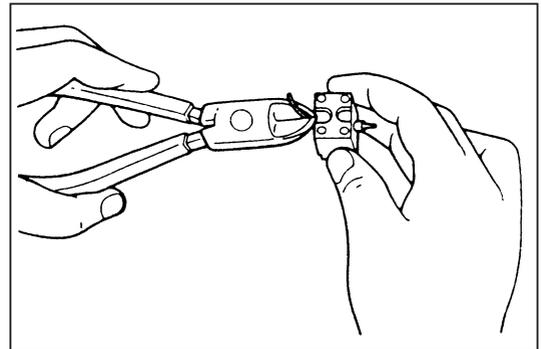
JCH00044-00035

- (4) Ensure that the brush moves freely in the brush holder.



JCH00045-00036

- (5) Cut off any excess remaining wire and apply an insulation paint.



JCH00046-00037

Rectifier

NOTE:

- Be sure to confirm the specification of the ohmmeter to be used for inspection before putting it into use.
- The current flow direction differs according to the design of an ohmmeter.
- This manual is described, based on a digital tester manufactured by DENSO Japan.

<Reference>

- The measured resistance should be about the same as those of other rectifiers, for the measurement results differ according to the input voltage of each tester.
- If the measured resistance of the rectifier differs more than 20 percent, replace the rectifier holder.

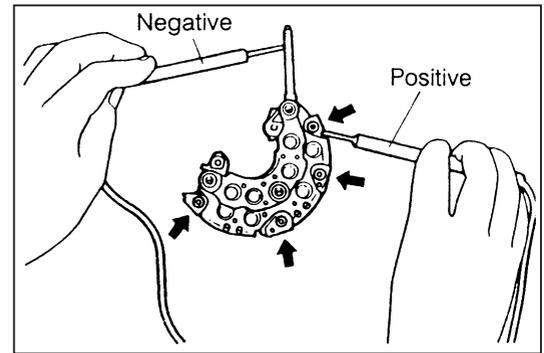
1. Inspection of rectifier at positive side

- (1) Ensure that continuity exists between the positive stud bolt of the rectifier holder and the rectifier terminal by connecting an ohmmeter as indicated in the right figure.

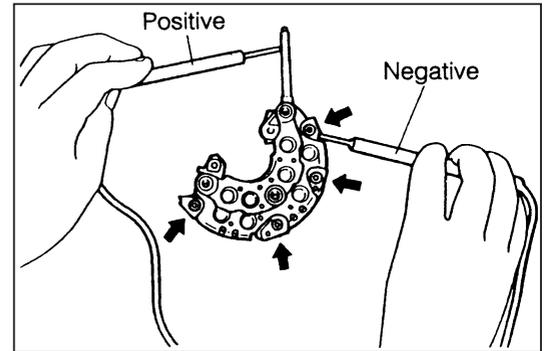
If no continuity exists, replace the rectifier holder.

- (2) Ensure that no continuity exists between the positive stud bolt of the rectifier holder and the rectifier terminal by connecting an ohmmeter as indicated in the right figure.

If continuity exists, replace the rectifier holder.



JCH00047-00038

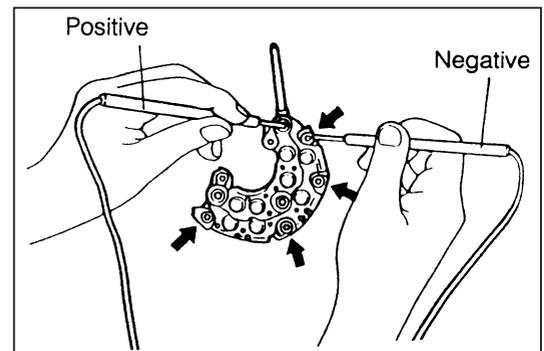


JCH00048-00039

2. Inspection of rectifier at negative side

- (1) Ensure that continuity exists between each of the negative terminals of the rectifier holder and each rectifier terminal by connecting an ohmmeter as indicated in the right figure.

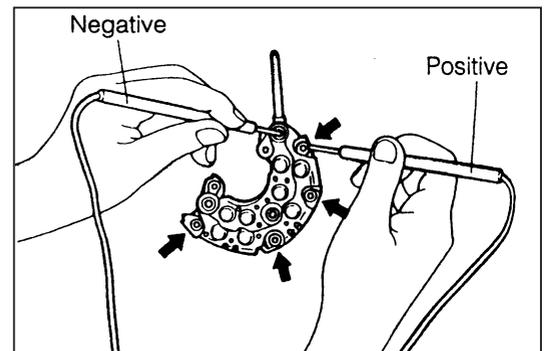
If no continuity exists, replace the rectifier holder.



JCH00049-00040

- (2) Ensure that no continuity exists between each of the negative terminals of the rectifier holder and each rectifier terminal by connecting an ohmmeter as indicated in the right figure.

If continuity exists, replace the rectifier holder.

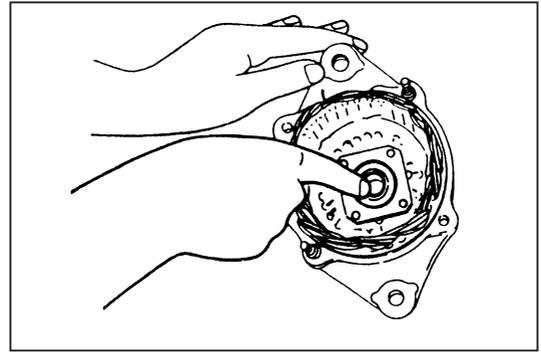


JCH00050-00041

CH-16

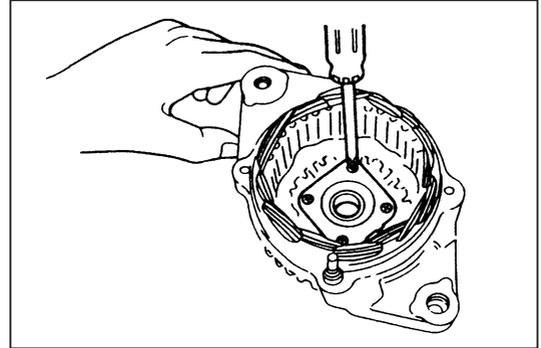
Bearings

1. Inspection of front bearing
Ensure that the bearing turns smoothly.
Replace the bearing, if necessary.



JCH00051-00042

2. Replacement of bearing
 - (1) Remove the four screws and retainer plate.

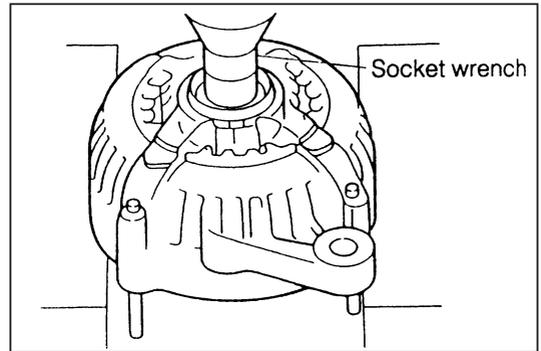


JCH00052-00043

- (2) Remove the front bearing from the drive end frame, using a suitable socket wrench in conjunction with a press.

CAUTION:

- Be very careful not to damage the coil and stud bolts during bearing removal.

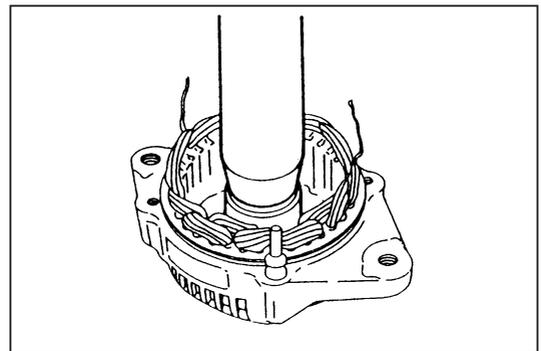


JCH00053-00044

- (3) Press a new front bearing into the drive end frame, using a suitable socket wrench in conjunction with a press.

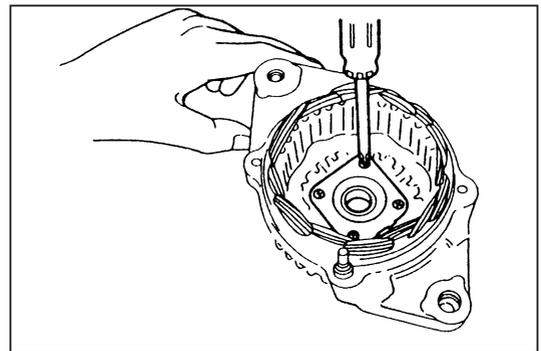
CAUTION:

- Be sure to hold the outer race of the new bearing during installation. Holding of the inner race or side cover will cause bearing damage.



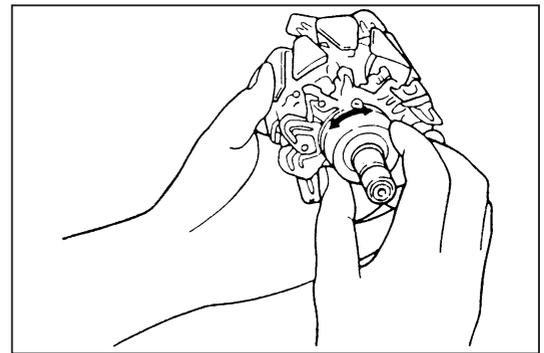
JCH00054-00045

- (4) Attach the retainer plate to the drive end frame with the four screws.



JCH00055-00046

3. Inspection of rear bearing
Ensure that the bearing turns smoothly.
Replace the bearing, if necessary.

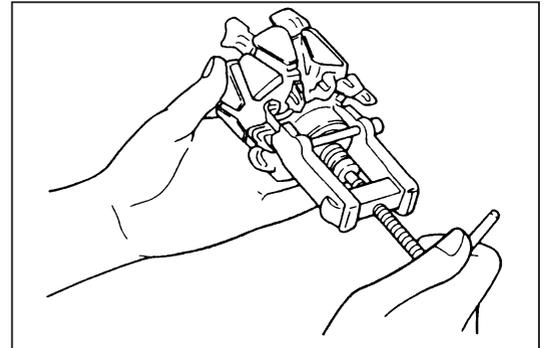


JCH00056-00047

4. Replacement of rear bearing
(1) Remove the rear bearing cover from the rotor, using the armature bearing puller.

CAUTION:

- Be very careful not to damage the fan during the removal.



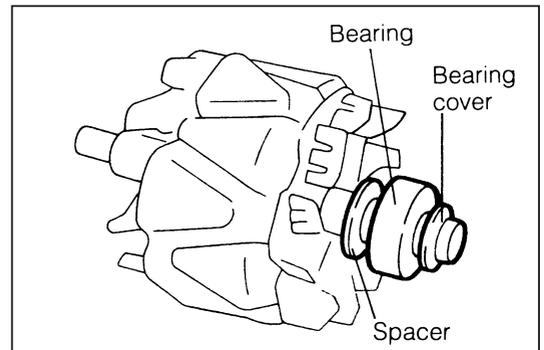
JCH00057-00048

- (2) Place the parts on the rotor in the following order.

Spacer
New rear bearing
New bearing cover

- (3) Press the assembled parts into the rotor, using a hydraulic press in combination with a suitable attachment or following SST.

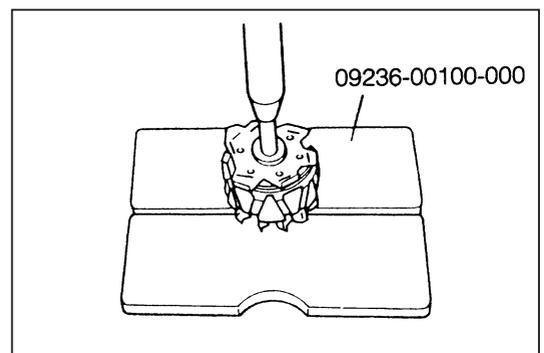
SST: 09236-00100-000



JCH00058-00049

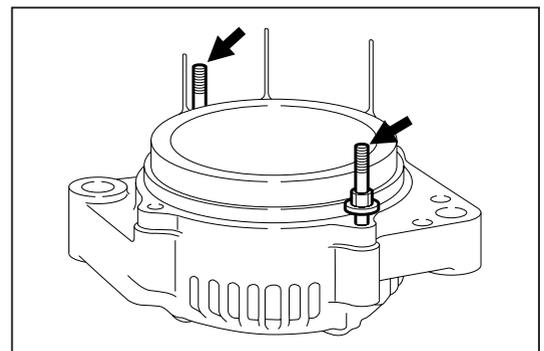
NOTE:

- Care must be exercised so that the point where the bearing is assembled to the rotor shaft may not deform the bearing cover.
Therefore, be sure to select a suitable attachment to assemble the bearing cover.



JCH00000-00050

5. Inspection/replacement of stud bolt
Visually inspect the thread portion of the stud bolt.
If any damage exists, replace the stud bolt.

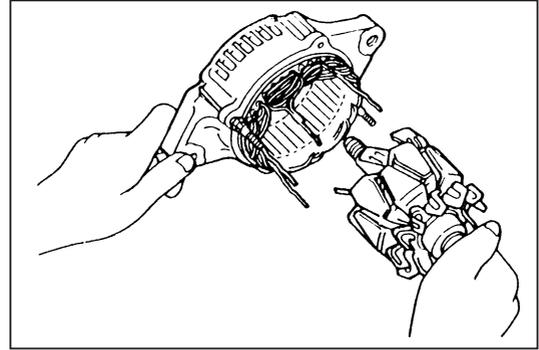


JCH00059-00051

CH-18

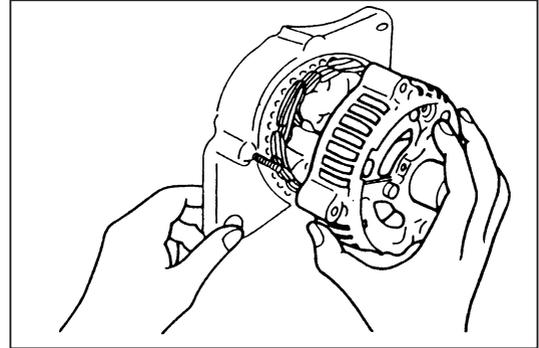
ASSEMBLY OF ALTERNATOR

1. Install the rotor in the drive end frame assembly.



JCH00060-00052

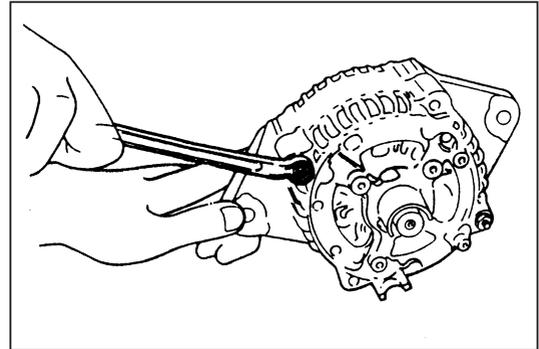
2. Installation of rectifier end frame on drive end frame
(1) Place the wave washer on the rear bearing.
(2) Install the rectifier end frame on the drive end frame with the two bolts and two nuts or four attaching nuts.



JCH00061-00053

CAUTION:

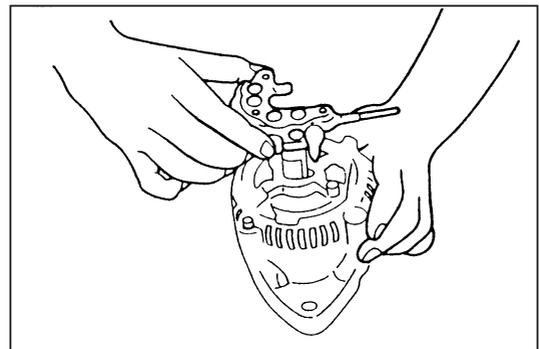
- Be very careful not to damage the coil cord during the installation.



JCH00000-00054

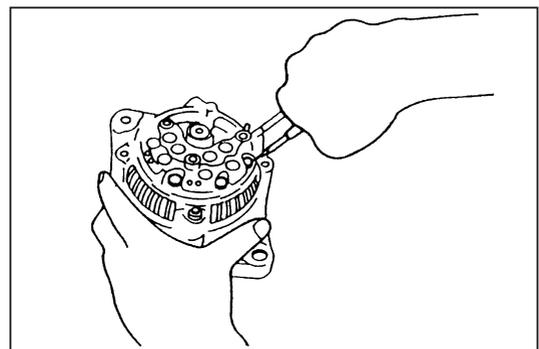
3. Installation of rectifier holder, regulator assembly and brush holder

(1) Attach the rectifier holder to the end frame with the coil wires passed through the aperture of the rectifier holder.



JCH00062-00055

(2) Wind the coil wires around the installing section of the rectifier attaching bolt hole.



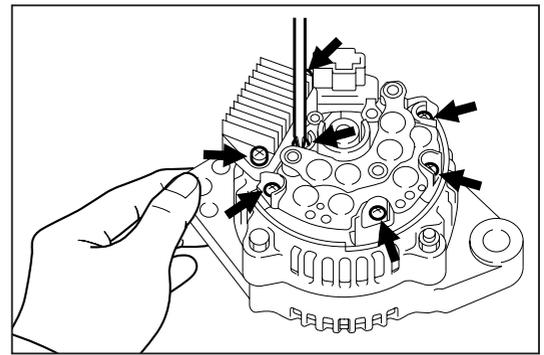
JCH00063-00056

- (3) Connect the coil wires to the rectifier holder with the attaching screws.
- (4) Install the rectifier holder and regulator assembly with the attaching screws.

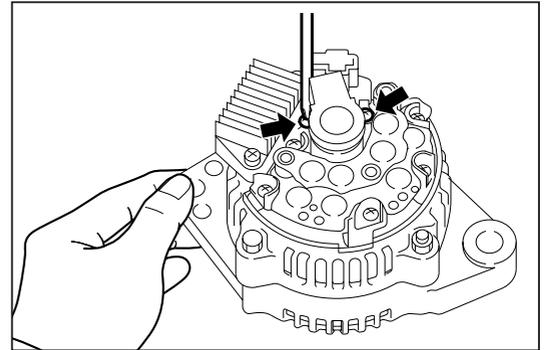
NOTE:

- Make sure that the regulator assembly is installed properly with the attaching screws as it works.

- (5) Install the brush holder in such a way that a gap of at least 1 mm is provided between the brush holder and the regulator assembly.
Secure the brush holder with the two screws.



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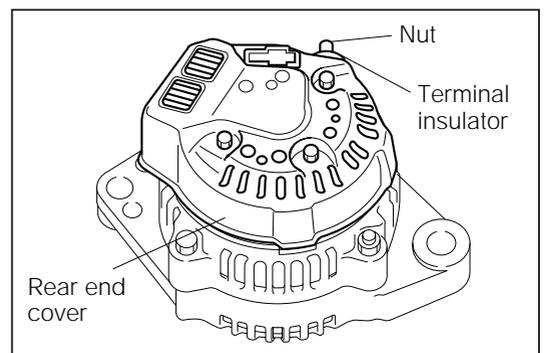


JCH00065-00058

4. Installation of rear end cover

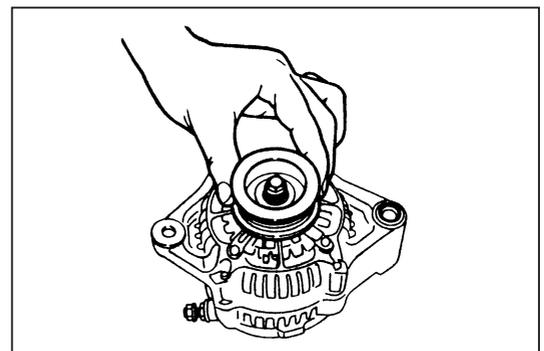
JCH00066-00000

- (1) Install the rear end cover on the alternator.
- (2) Secure the rear end cover with the three attaching nuts or screws.
- (3) Install the terminal insulator.
- (4) Secure the terminal insulator attaching nut.



JCH00067-00059

5. Attach the pulley to the rotor shaft.



JCH00068-00060

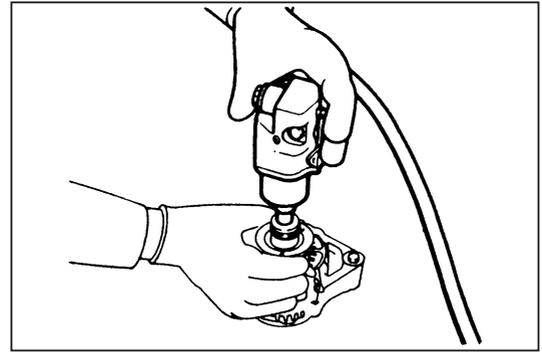
CH-20

6. Install the pulley lock nut by means of an impact wrench.

CAUTION:

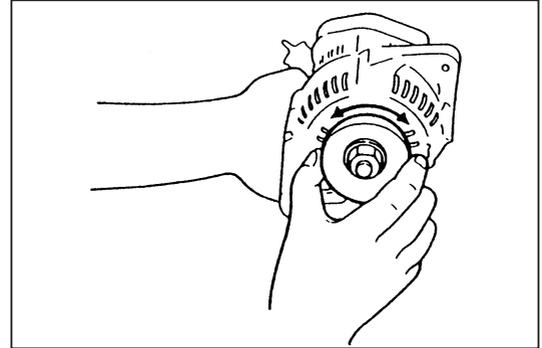
- Be sure to use an impact wrench having a hexagonal hole.
- Be sure to set the tightening torque of the impact wrench as follows.

Tightening Torque: 110.5 N·m



JCH00069-00061

7. Ensure that the rotor turns smoothly.



JCH00070-00062

INSTALLATION OF ALTERNATOR

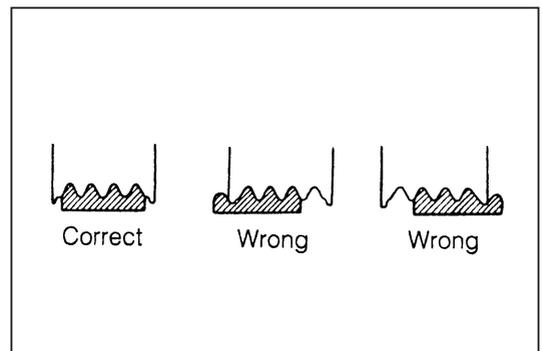
1. Insert the alternator from under side of the vehicle.
2. Install the alternator to the alternator bracket temporarily with the attaching bolt.

JCH00071-00000

3. Install the upper attaching bolt of the alternator temporarily.
4. Installation of alternator drive belt
Install the alternator drive belt to the engine properly.

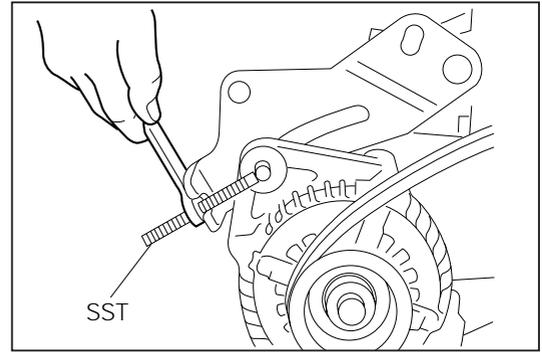
CAUTION:

- Make sure that the alternator drive belt is properly engaged in the groove of each pulley.



JCH00072-00063

5. Tension adjustment of drive belt
 - (1) Install the following SST to the alternator and adjusting bar as shown in the right figure.
SST: 09286-87701-000

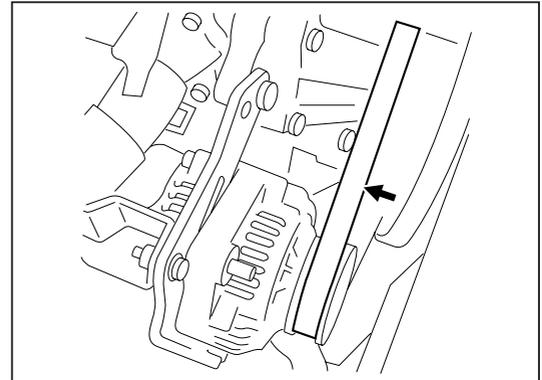


- (2) Adjust the drive belt tension to the specified value by adjusting the nut of the SST.

Specified Belt Deflection

New Belt: 4 - 5 mm
[with a force of 10 kgf applied to the point shown in the figure]

Used Belt: 5 - 6 mm
[with a force of 10 kgf applied to the point shown in the figure]



NOTE:

- As for definition of new belts and used belts, refer to the MA section of the service manual.

- (3) Tighten the alternator attaching bolts to the specified torque.

Tightening Torque: 34.3 - 54.9 N·m
(3.5 - 5.5 kgf-m)

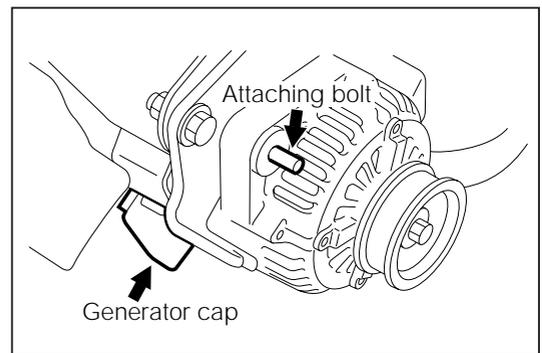
- (4) Remove the SST from the alternator and adjusting bar.

6. Connect the alternator connector of the alternator wire to the alternator.

NOTE:

- Make sure that the lock of the connector is locked properly after connection.

7. Connect the terminal B of the alternator wire to the alternator with the attaching nut.
8. Install the generator cap.
9. Reconnect the ground cable terminal to the negative terminal of the battery.
10. Perform the in-vehicle inspection.
11. Install the right engine undercover.
12. Install the air conditioner drive belt.
(Refer to the air conditioner installation manual issued by DENSO CO., LTD.)



CH-22

SERVICE SPECIFICATIONS

Battery specific gravity (Except Delco Freedom battery)			1.25 - 1.27
Alternator: 50A (For manual transmission vehicles)	Rated output	Amperage	50A
	Rotor coil resistance	Resistance	2.9 Ω at 20°C (68°F)
	Slip ring diameter	Standard	14.4 mm
		Minimum	14.0 mm
	Brush exposed length	Standard	10.5 mm
		Minimum	8.4 mm
	IC regulating voltage	Hi level	14.1 - 15.2 volts
Alternator: 55A (For automatic transmission vehicles)	Rated output	Amperage	55A
	Rotor coil resistance	Resistance	2.9 Ω at 20°C (68°F)
	Slip ring diameter	Standard	14.4 mm
		Minimum	14.0 mm
	Brush exposed length	Standard	10.5 mm
		Minimum	8.4 mm
	IC regulating voltage	Hi level	14.1 - 15.2 volts

JCH00075-00000

TROUBLE SHOOTING

Problem	Possible causes	Remedies	Page
Charge warning lamp will not glow even if ignition switch is turned ON.	Fuse blown Lamp bulb burnt Poor connection of wiring	Check gauge fuse. Replace bulb. Repair poor connection of wiring. Repair or replace. Replace regulator assembly.	BE-6 BE Section BE Section CH-3
Charge warning lamp will not go out even if engine has started.	Drive belt loose or worn Battery cables loose, corroded or worn Fuse blown Fusible link blown IC regulator or alternator faulty Wiring faulty	Adjust or replace. Repair or replace cables. Check gauge fuse. Replace fusible link. Check charging system. Repair or Replace.	MA-6 CH-3

JCH00076-00000