

CHARGING SYSTEM

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CH

CH-2

CHARGING SYSTEM — Precautions, Troubleshooting

PRECAUTIONS

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 when the engine is running.

TROUBLESHOOTING

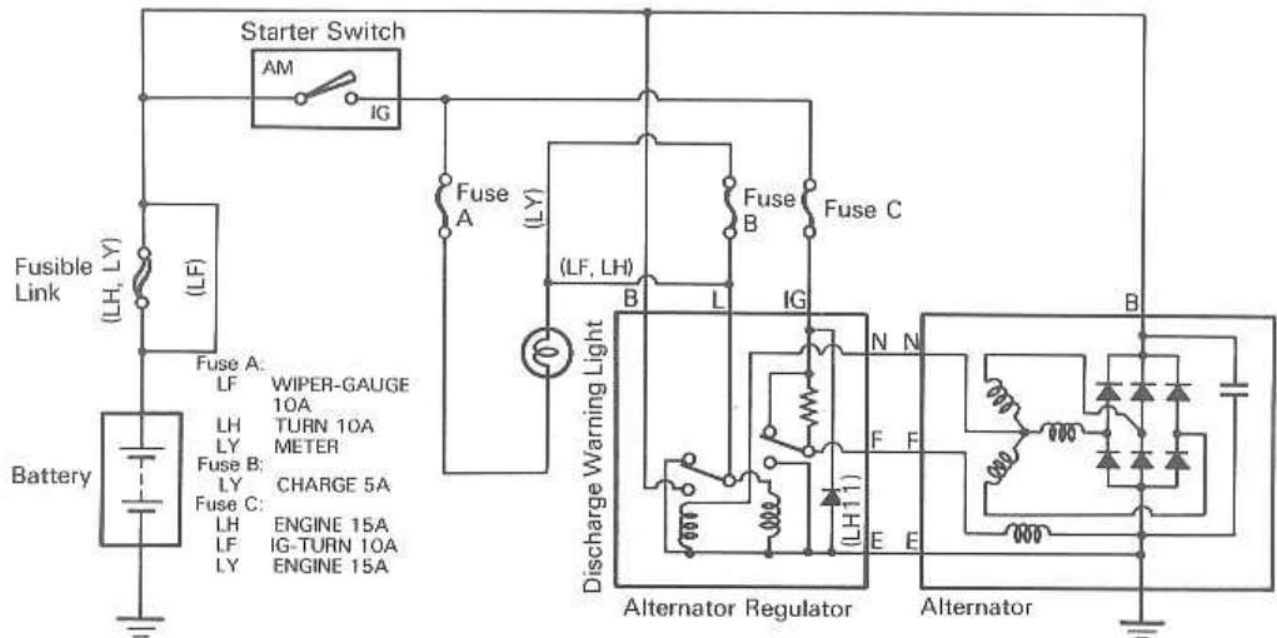
Problem	Possible cause	Remedy	Page
Charge light does not light with starter switch at "ON" and engine not running	Fuse blown	Check fuses ● Fuse A: LF WIPER-GAUGE LH11 (Indonesia) TURN LH11 (ex. Indonesia) TURN-GAUGE LH51, 61, 71, LN, LX IGN LY METER ● Fuse B: LH11 (Indonesia), LH51, 61, 71, LN, LS, LX, LY CHARGE ● Fuse C: ex. LF ENGINE LF IG-TURN	CH-3, 4
	Light burned out	Replace light	
	Wiring connection loose	Tighten loose connections	
	Alternator regulator faulty	Check regulator	CH-20
	Charge light relay faulty	Check relay	CH-18
	IC regulator faulty	Replace IC regulator	CH-9
Discharge warning light does not go out with engine running (battery requires frequent recharging)	Drive belt loose or worn	Adjust or replace drive belt	CH-5
	Battery cables loose, corroded or worn	Repair or replace cables	
	Fuse blown	Check fuse C: ex. LF ENGINE LF IG-TURN	CH-3
	Main relay faulty (w/o IC regulator)	Check main relay	CH-20
	Fusible link blown	Replace fusible link	
	Alternator regulator, charge light relay, IC regulator or alternator faulty	Check charging system	CH-5
	Wiring faulty	Repair wiring	

CHARGING SYSTEM — Charging System Circuit

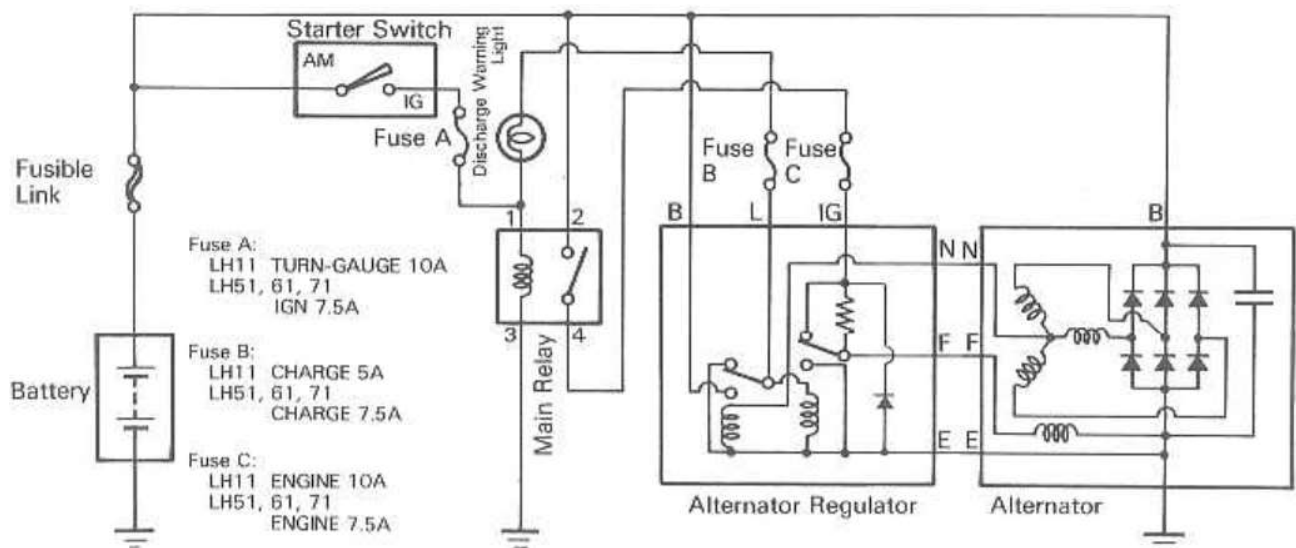
CH-3

CHARGING SYSTEM CIRCUIT

w/o IC Regulator [LF, LH11 (Indonesia), LY]



w/o IC Regulator [LH11 (ex. Indonesia), LH51, 61, 71]

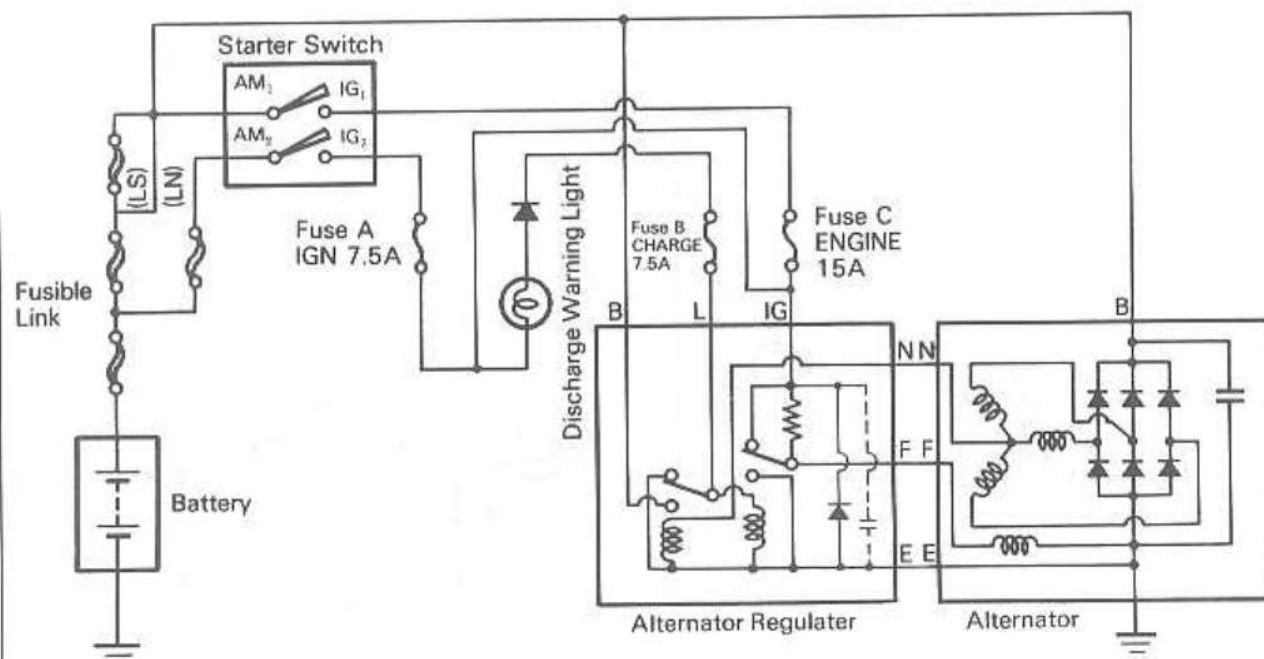
CH0089
CH0090

CH-4

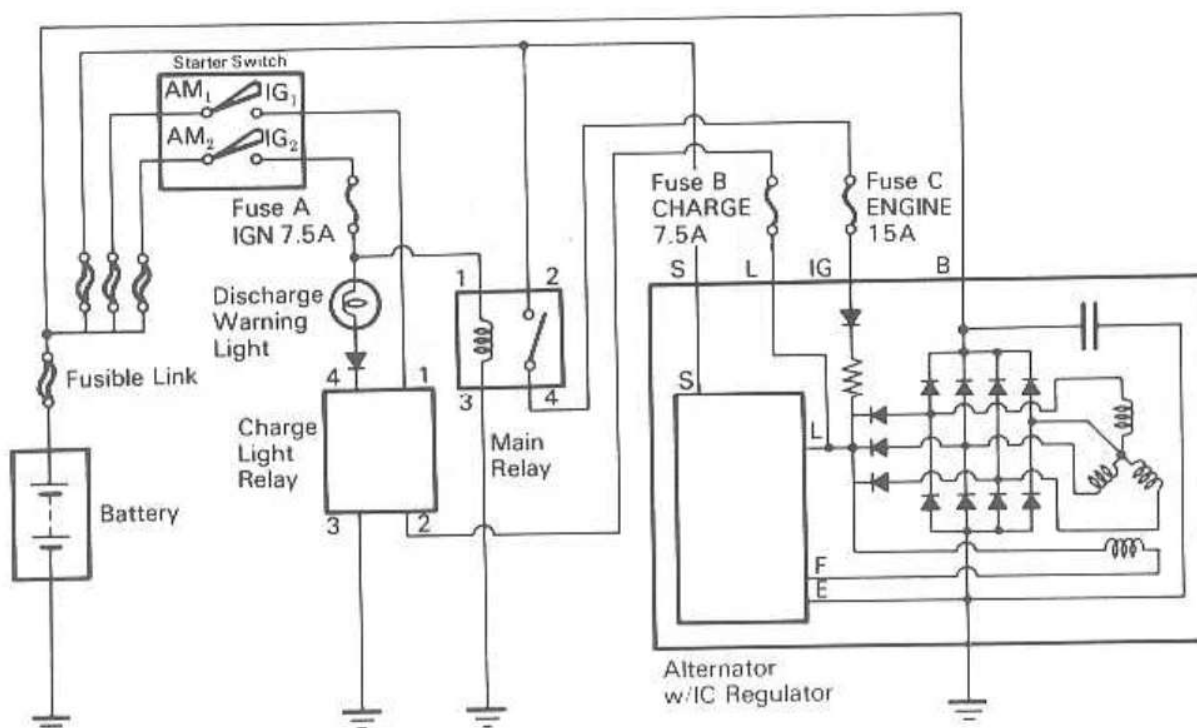
CHARGING SYSTEM — Charging System Circuit

CHARGING SYSTEM CIRCUIT (Cont'd)

w/o IC Regulator [LN, LS]

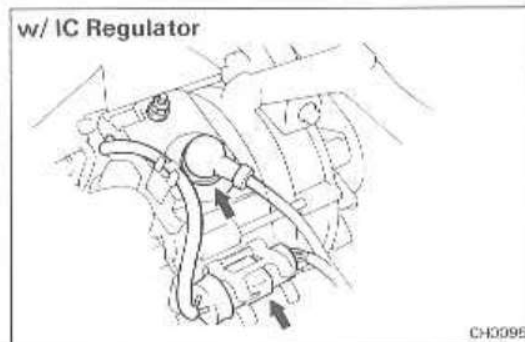
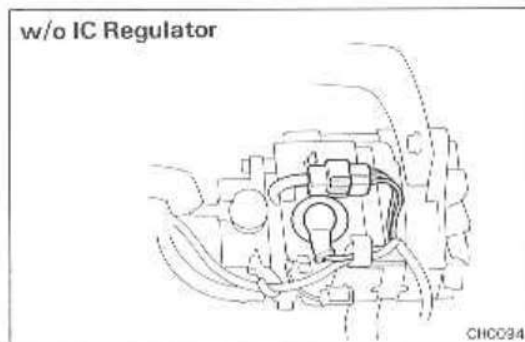
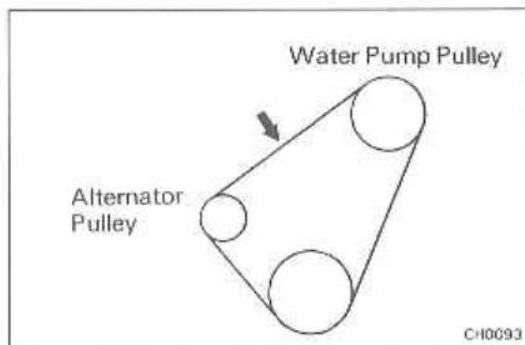
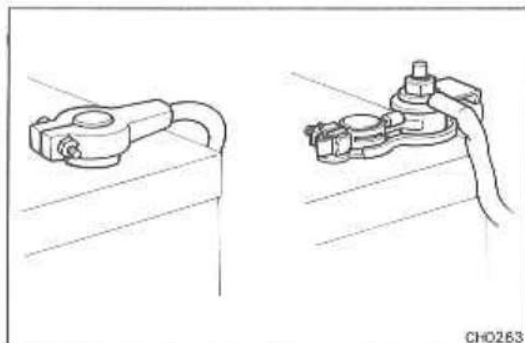
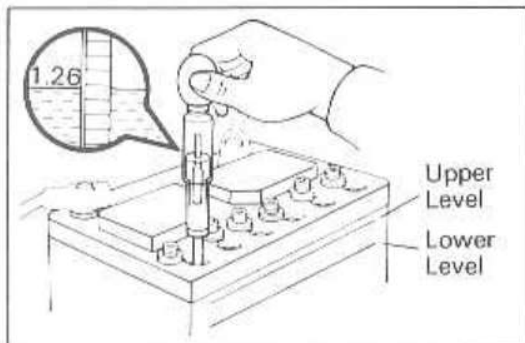


w/ IC Regulator [LX]

CH0091
CH0092

CHARGING SYSTEM — On-Vehicle Inspection

CH-5



ON-VEHICLE INSPECTION

1. INSPECT BATTERY SPECIFIC GRAVITY

- (a) Check the specific gravity of each cell.

Standard specific gravity:

When fully charged at 20°C (68°F)

1.25 – 1.27 (ex. NX110, 120, 200, 125D38L)

1.27 – 1.29 (NX110, 120, 200, 125D38L)

- (b) Check the electrolyte quantity of each cell.

If insufficient, refill with distilled (or purified) water.

2. CHECK BATTERY TERMINALS, FUSIBLE LINKS AND FUSES

- (a) Check that the battery terminals are not loose or corroded.

- (b) Check the fusible link and fuses for continuity.

3. INSPECT DRIVE BELT

Check the drive belt deflection by pressing on the belt at the points indicated in the figure with 10 kg (22.0 lb, 98 N) of pressure.

Drive belt deflection:

New belt 7 – 10 mm (0.28 – 0.39 in.)

Used belt 10 – 15 mm (0.39 – 0.59 in.)

If necessary, adjust the drive belt deflection.

NOTE:

- "New belt" refers to a belt which has never been used.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

4. VISUALLY CHECK ALTERNATOR WIRING AND LISTEN FOR ABNORMAL NOISES

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

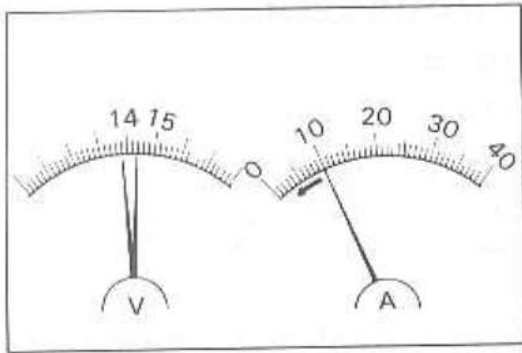
5. INSPECT CHARGE LIGHT CIRCUIT

- (a) Warm up the engine and then turn it off.
- (b) Turn off all accessories.
- (c) Turn the starter switch to "ON". Check that the charge light is lit.
- (d) Start the engine. Check that the light goes out.

If the light does not operate as described, troubleshoot the charge light circuit.

CH-6

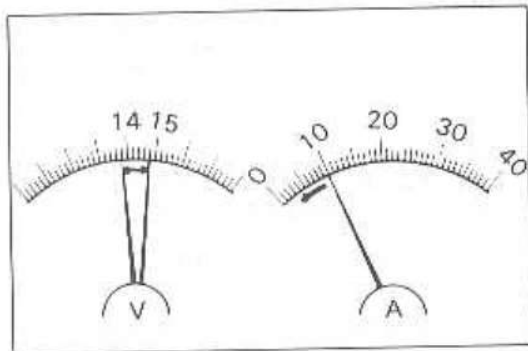
CHARGING SYSTEM — On-Vehicle Inspection



6. INSPECT CHARGING CIRCUIT WITHOUT LOAD

NOTE: If a battery/alternator 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 alternator 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 alternator.
 - Connect the positive lead of the voltmeter to terminal B of the alternator.
 - Ground the negative lead of the voltmeter.

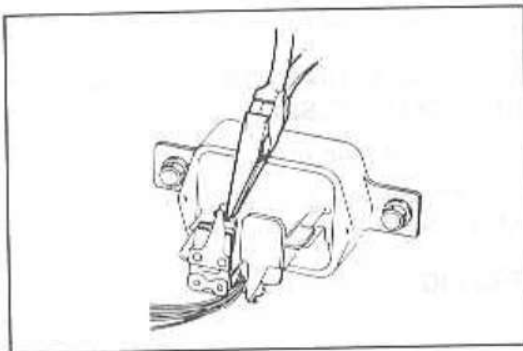


- (b) Check the charging circuit as follows:

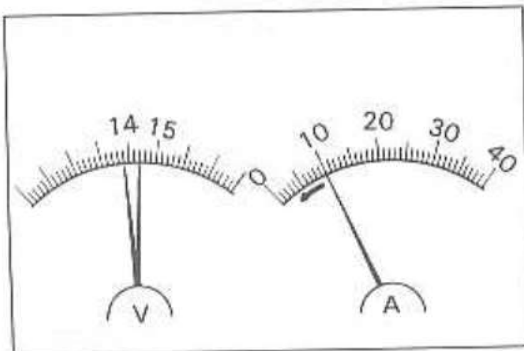
With the engine running from idle to 2,000 rpm, check the reading on the ammeter and voltmeter.

[w/o IC REGULATOR]

Standard amperage: Less than 10A
Standard voltage: 13.8 – 14.8V



If the reading is not within standard voltage, adjust the regulator or replace it.



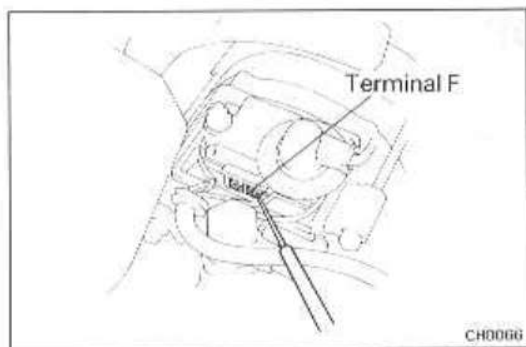
[w/ IC REGULATOR]

Standard amperage: Less than 10A
Standard voltage: 13.8 – 14.4V (25°C or 77°F)

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

CHARGING SYSTEM — On-Vehicle Inspection

CH-7

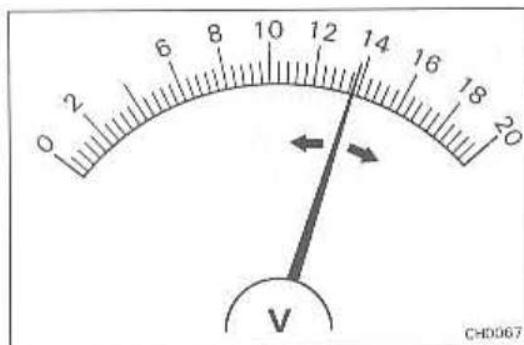


If the voltage reading is less than standard voltage, check the IC regulator and alternator as follows:

- Remove the brush holder cover and connect the terminal B wire to the original position.

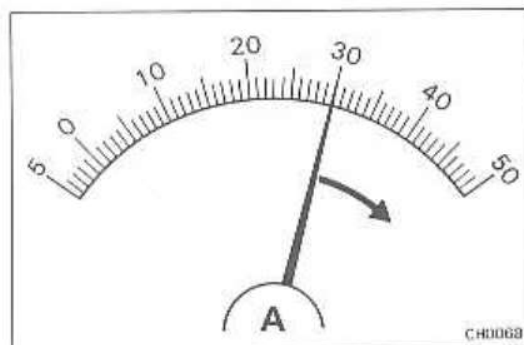
CAUTION: Battery voltage is applied to terminal B, so disconnect the battery before beginning work.

- With terminal F grounded, start the engine and check the reading on the voltmeter.



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

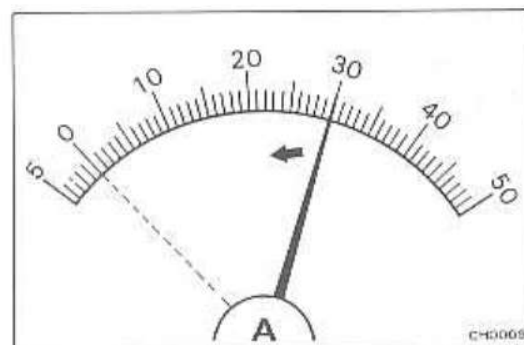
If the voltage reading is less than standard voltage, check the alternator.



7. CHECK CHARGING CIRCUIT WITH LOAD

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

Standard amperage: More than 30A



If the ammeter reading is less than 30A, repair the alternator. (See page CH-8)

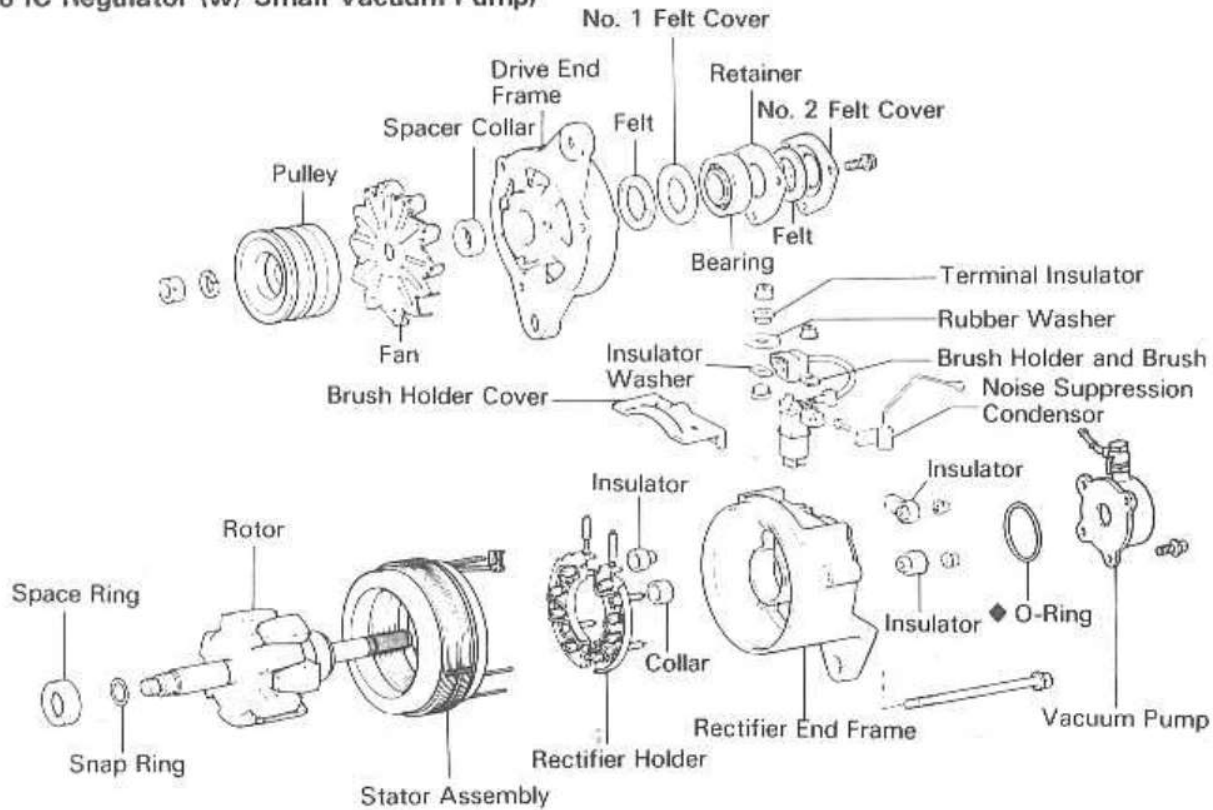
NOTE: If the battery is fully charged, the indication will sometimes be less than 30A.

CH-8

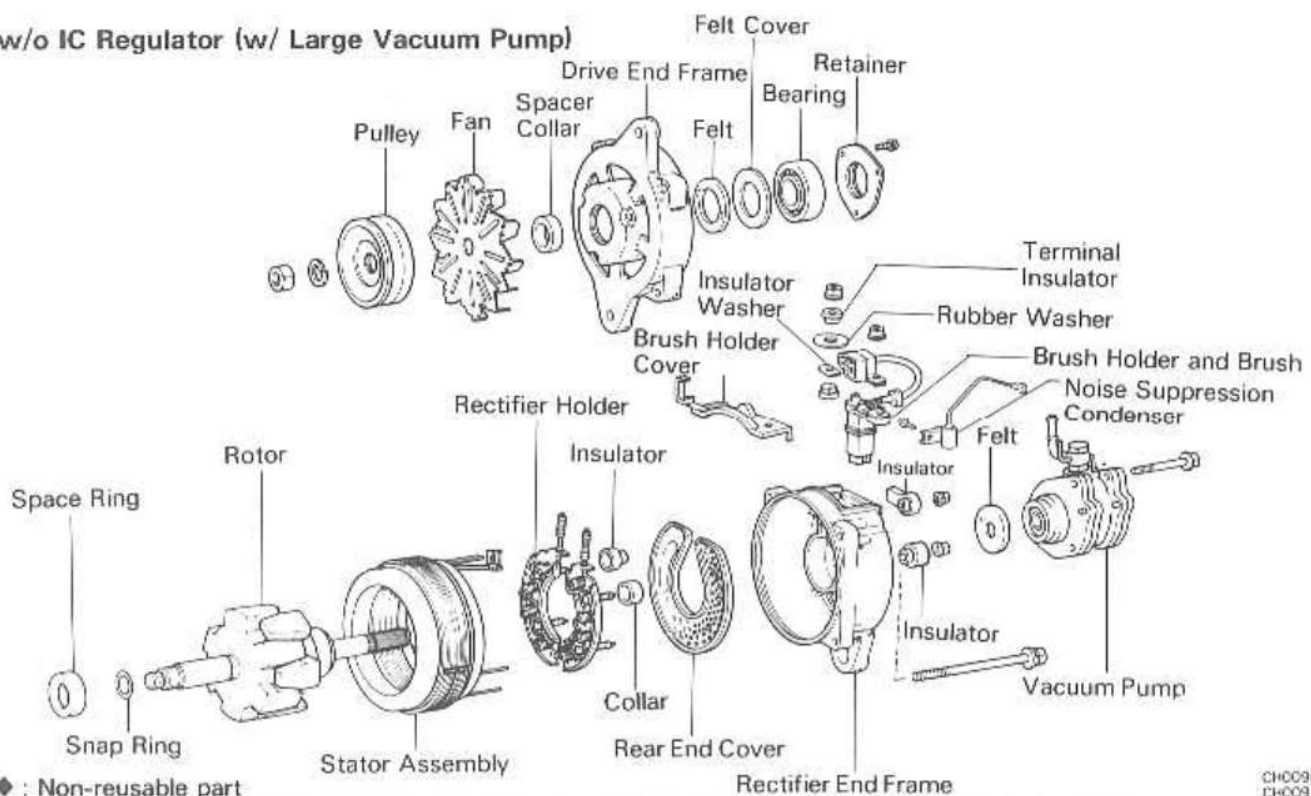
CHARGING SYSTEM — Alternator

ALTERNATOR COMPONENTS

w/o IC Regulator (w/ Small Vacuum Pump)



w/o IC Regulator (w/ Large Vacuum Pump)



◆ : Non-reusable part

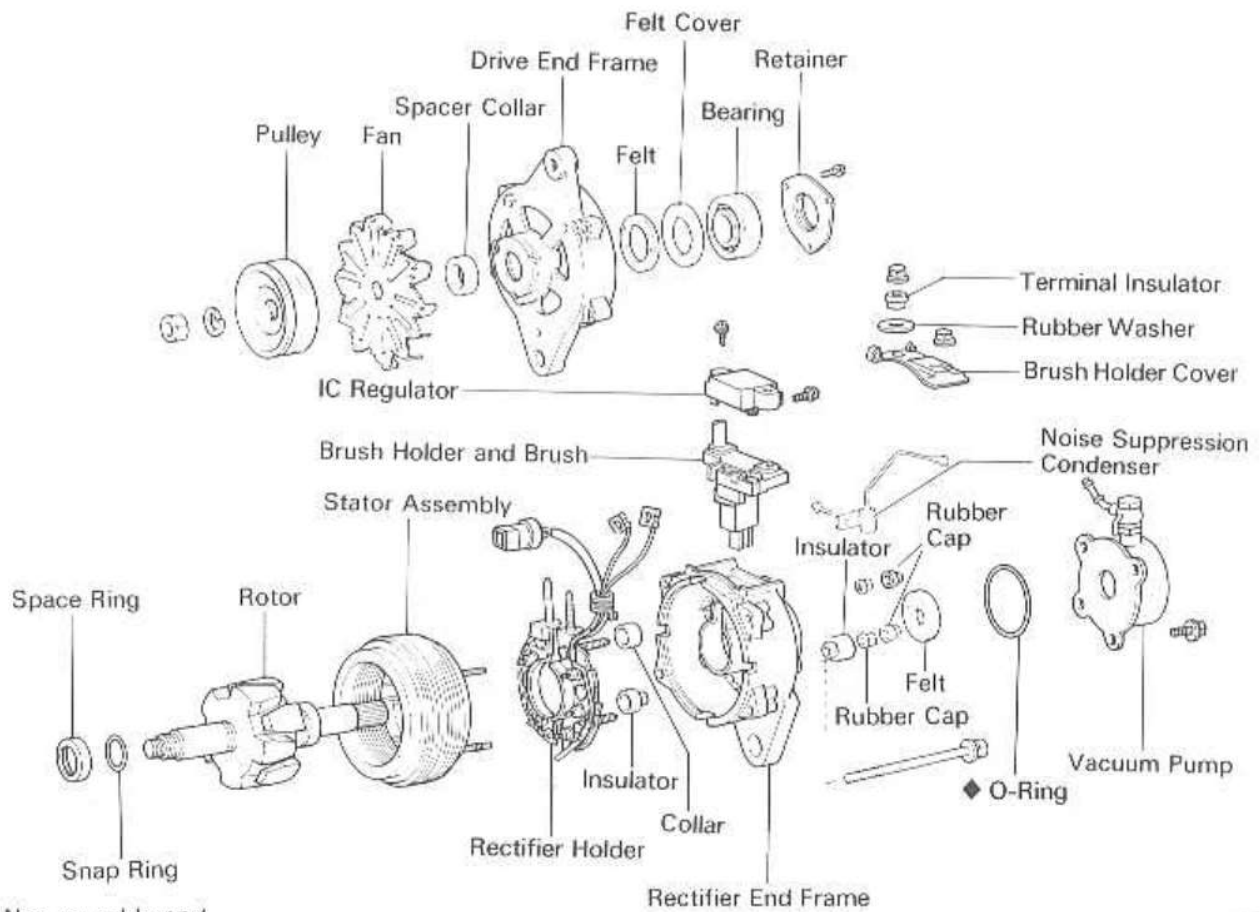
CHC095
CHC097

CHARGING SYSTEM — Alternator

CH-9

COMPONENTS (Cont'd)

W/ IC Regulator



CH0098

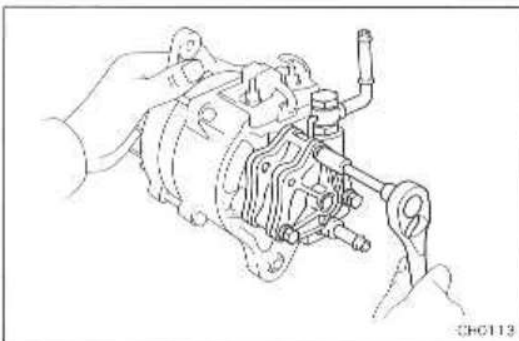
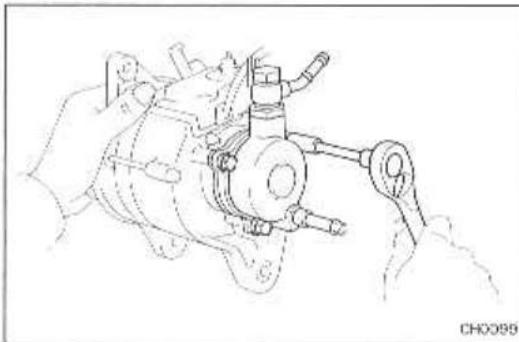
DISASSEMBLY OF ALTERNATOR

1. REMOVE VACUUM PUMP
[w/ Small Vacuum Pump]

Remove the three bolts, vacuum pump and O-ring.

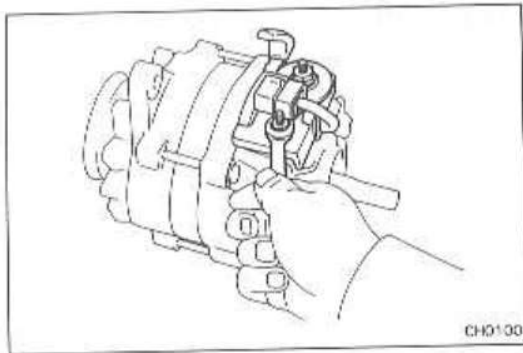
[w/ Large Vacuum Pump]

Remove the three through bolts, vacuum pump and felt.



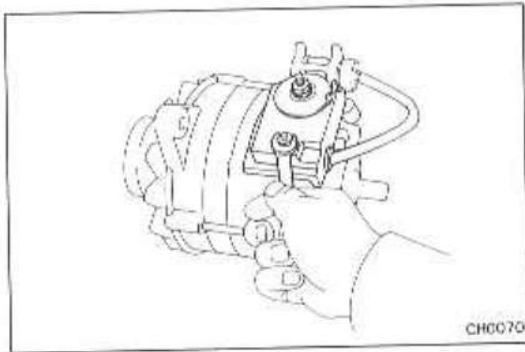
CH-10

CHARGING SYSTEM — Alternator



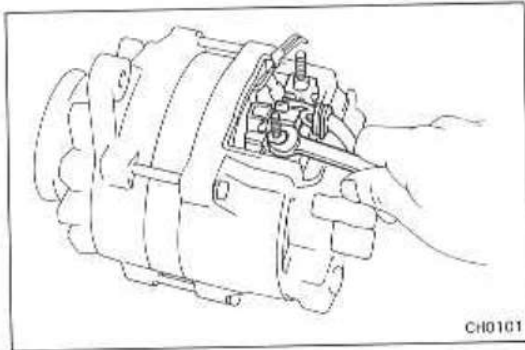
2. REMOVE BRUSH HOLDER COVER
[w/o IC Regulator]

Remove the two nuts, terminal insulator, rubber washer, wire clamp, cover and insulator washer.



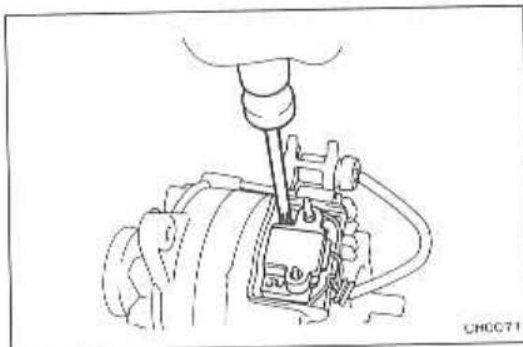
[w/ IC Regulator]

Remove the two nuts, terminal insulator, rubber washer and cover.



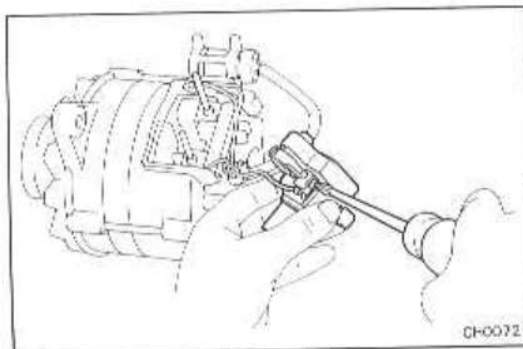
3. [w/o IC REGULATOR]
REMOVE BRUSH HOLDER

- (a) Disconnect the lead wire.
- (b) Remove the nut and brush holder.

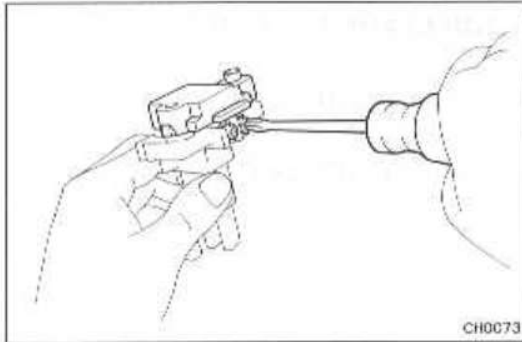


[w/ IC REGULATOR]
REMOVE BRUSH HOLDER AND IC REGULATOR

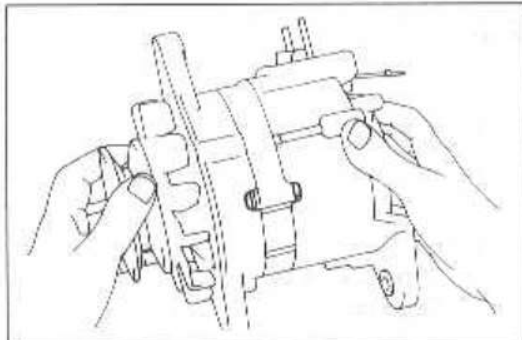
- (a) Remove the screw and disconnect the blue lead wire.
- (b) Pull out the brush holder with the IC regulator from the rectifier holder.



- (c) Remove the screw and disconnect the lead wire from the brush holder.

CHARGING SYSTEM — Alternator**CH-11**

- (d) Remove the two screws and separate the IC regulator and brush holder.

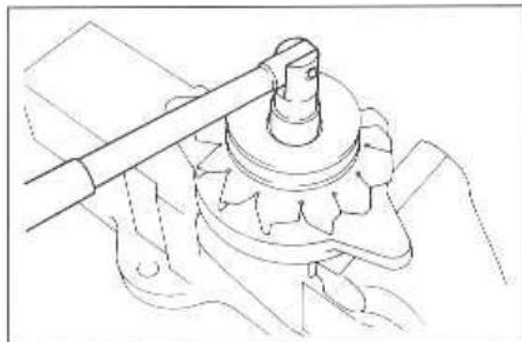


4. REMOVE DRIVE END FRAME WITH ROTOR FROM STATOR

- (a) **[w/ Small Vacuum Pump]**
Remove the three through bolts.
[w/ Large Vacuum Pump]
Remove the four through bolts.

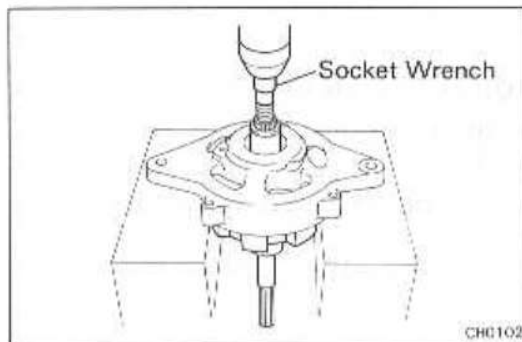
- (b) Remove the end frame with the rotor.

NOTE: If necessary, lightly tap the rotor shaft with a plastic-face hammer.



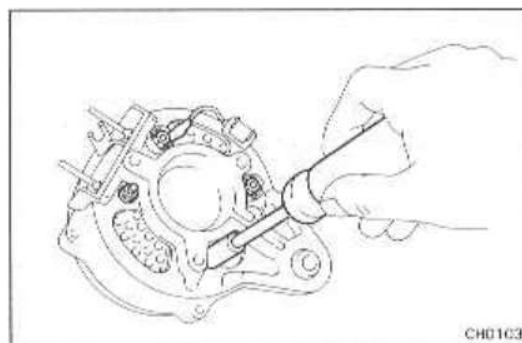
5. REMOVE PULLEY AND FAN

- (a) Mount the rotor in a soft jaw vise.
(b) Remove the pulley nut, spring washer pulley and fan.



6. REMOVE ROTOR

- (a) Using a socket wrench and press, press out the rotor, spacer ring and collar.
(b) Remove the snap ring from the rotor shaft.

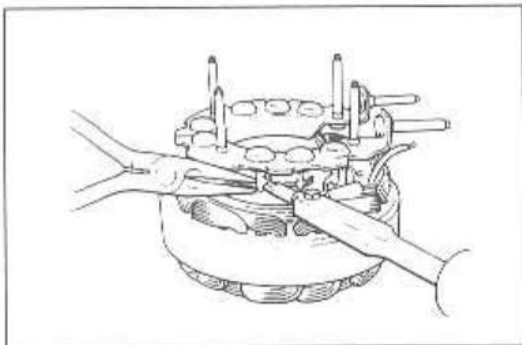


7. REMOVE STATOR WITH RECTIFIER HOLDER

- (a) **[w/ IC Regulator]**
Remove the two rubber caps.
(b) Remove the four nuts, two terminal insulators and stator with the rectifier holder.
(c) **[w/o IC Regulator (w/ Small Vacuum Pump)]**
Remove the rear end cover from the rectifier holder.
(d) Remove the two insulators and two collars from the rectifier holder studs.

CH-12

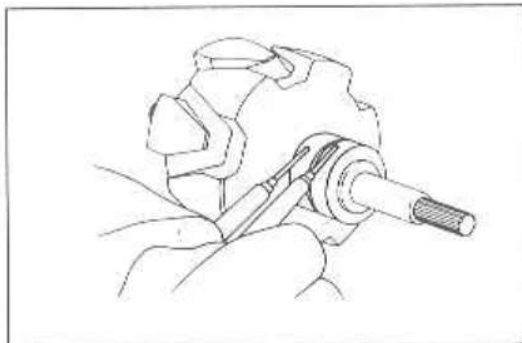
CHARGING SYSTEM — Alternator



8. UNSOLDER STATOR LEADS FROM RECTIFIER HOLDER

Hold the rectifier terminal with needle-nose pliers and unsolder the leads.

CAUTION: Protect the rectifiers from heat.



INSPECTION OF ALTERNATOR

Rotor

1. INSPECT ROTOR FOR OPEN CIRCUIT

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

Standard resistance:

w/o IC Regulator Approx. 4.0 Ω

w/ IC Regulator Approx. 2.9 Ω

If there is no continuity, replace the rotor.

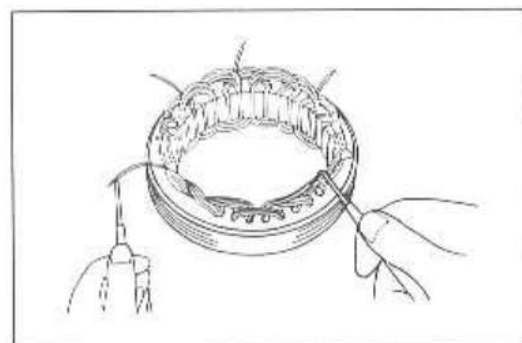
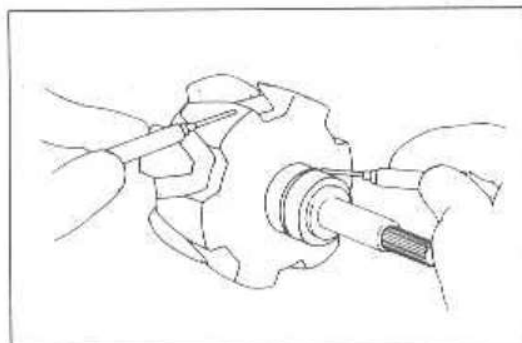
2. INSPECT ROTOR FOR GROUND

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 necessary, replace the rotor.



Stator

1. INSPECT STATOR FOR OPEN CIRCUIT

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

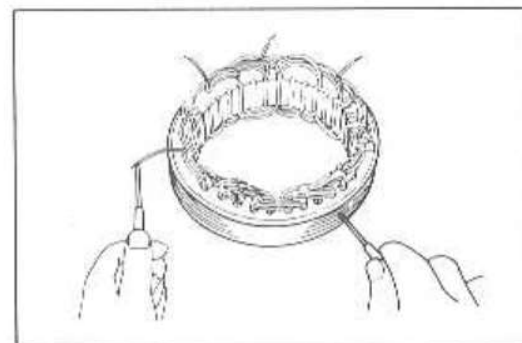
NOTE: At this time, the meeting wires should be connected with solder.

If there is no continuity, replace the stator.

2. INSPECT STATOR FOR GROUND

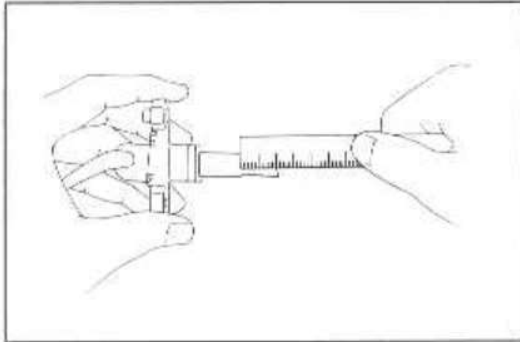
Using an ohmmeter, check that there is no continuity between the coil leads and stator core.

If there is continuity, replace the stator.



CHARGING SYSTEM — Alternator

CH-13

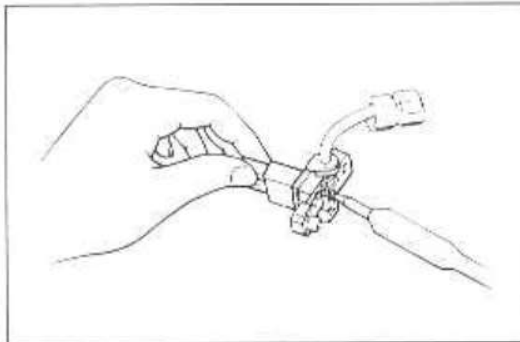
**Brush and Brush Holder****1. INSPECT BRUSH LENGTH**

Using a scale, measure into the brush length.

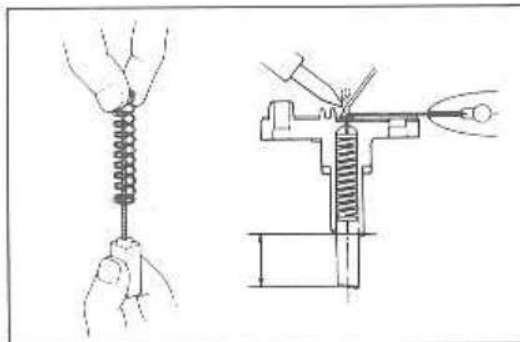
Standard length: 20 mm (0.79 in.)

Minimum length: 5.5 mm (0.217 in.)

If the brush length is less than minimum, replace the brush.

**2. IF NECESSARY, REPLACE BRUSH**

(a) Unsolder and remove the brush and spring.



(b) Insert the brush wire through the spring.

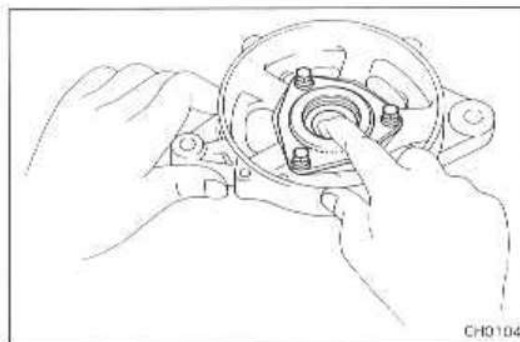
(c) Install the brush in the brush holder.

(d) Solder the wire to the brush holder at the standard length.

Standard length: 20 mm (0.79 in.)

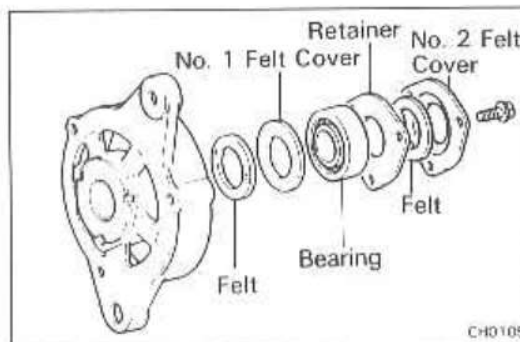
(e) Check that the brush moves smoothly in the brush holder.

(f) Cut off any excess wire.

**Bearing****1. INSPECT BEARING**

Check the bearing for roughness.

If rough, replace the bearing.

**2. IF NECESSARY, REPLACE BEARING**

(a) Remove the following parts:

(1) Three bolts

(2) No. 2 felt cover (w/ Small vacuum pump)

(3) Felt (w/ Small vacuum pump)

(4) Retainer

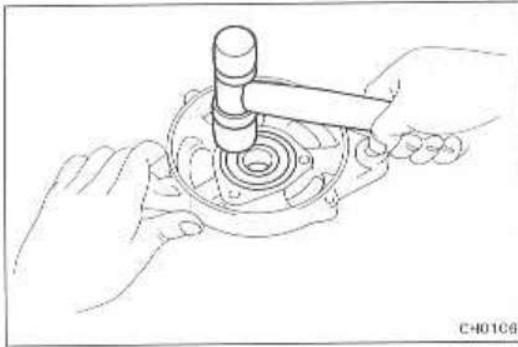
(5) Bearing

(6) No. 1 felt cover

(7) Felt

CH-14

CHARGING SYSTEM — Alternator



(b) Install the following parts:

- (1) Felt
- (2) No.1 felt cover
- (3) Bearing
If necessary, lightly tap the bearing with a plastic-face hammer.
- (4) Retainer
- (5) Felt (w/ Small vacuum pump)
- (6) No. 2 felt cover (w/ Small vacuum pump)
- (7) Three bolts

ASSEMBLY OF ALTERNATOR

(See page CH-8)

1. SOLDER EACH STATOR LEAD TO RECTIFIER HOLDER

Hold the rectifier terminal with needle-nose pliers while soldering the leads.

CAUTION: Protect the rectifiers from heat.

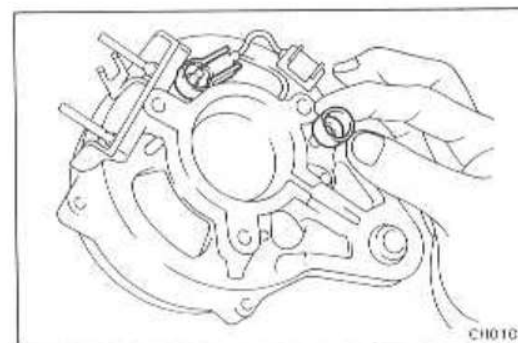
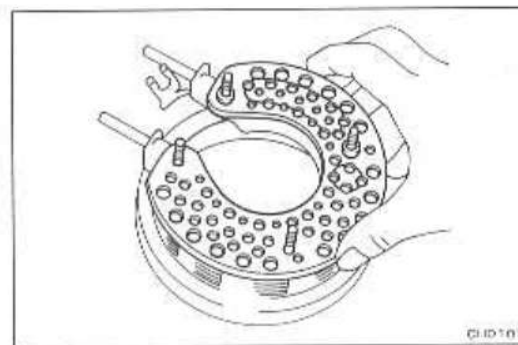
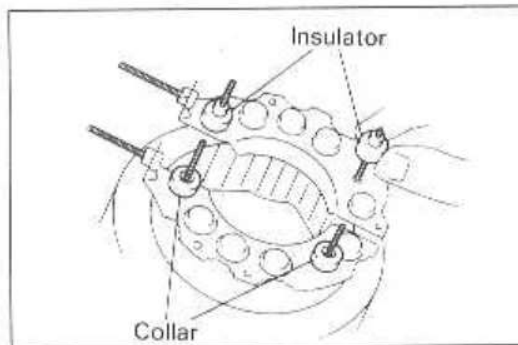
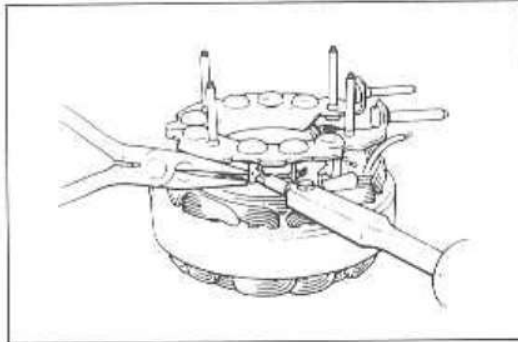
2. ASSEMBLE RECTIFIER END FRAME AND RECTIFIER HOLDER

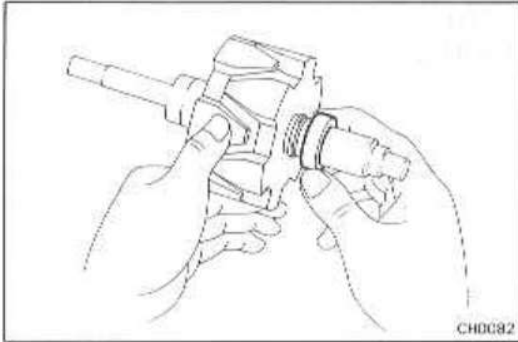
- (a) Place the two inner terminal insulators on the positive side studs.
- (b) Place the collars on the negative side studs.

(c) [w/o IC Regulator (w/ Large Vacuum Pump)]
Place the rear end cover on the studs.

- (d) Install the rectifier end frame on the rectifier holder.
- (e) Check that the wires are not touching the case.

- (f) Place the two outer terminal insulators on the positive side studs.
- (g) Install the lead wire of the noise suppression condenser on the top positive side studs. (w/ Noise suppression condenser)
- (h) Install the four nuts on the studs.
- (i) [w/ IC Regulator]
Install the two rubber caps on the positive side studs.

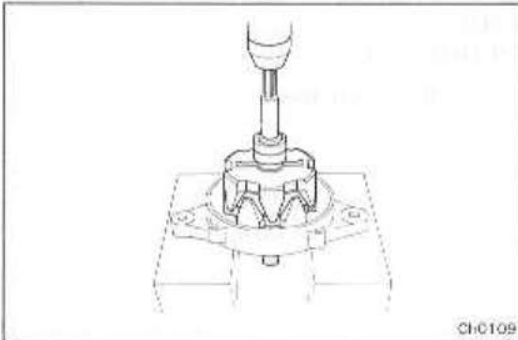


CHARGING SYSTEM — Alternator**CH-15**

CH0082

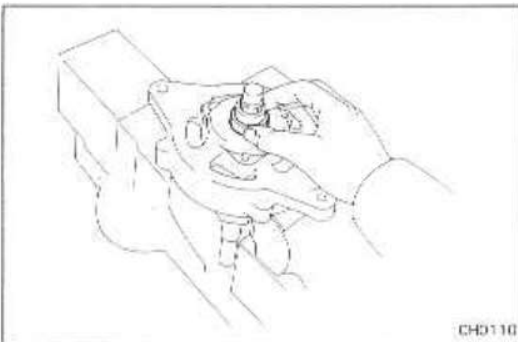
3. INSTALL ROTOR

- (a) Install the snap ring on rotor shaft groove.
- (b) Install the space ring on the rotor shaft.



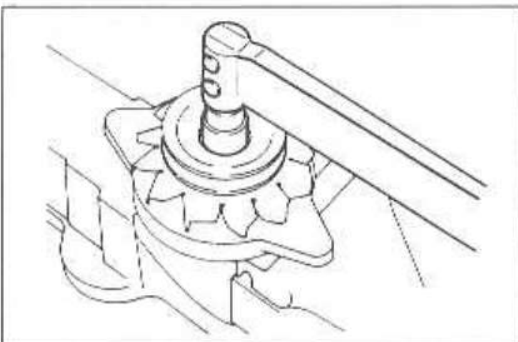
CH0109

- (c) Using a press, press in the rotor.



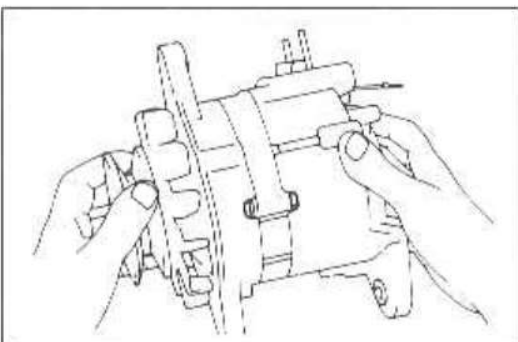
CH0110

- (d) Install the spacer collar.

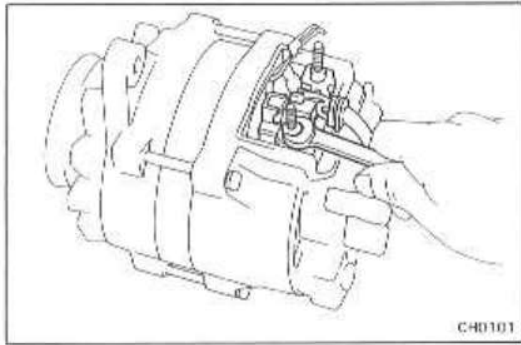
**4. INSTALL FAN AND PULLEY**

- (a) Mount the rotor in a soft-jaw vise.
- (b) Slide the fan, pulley and spring washer onto the shaft.
- (c) Install and torque the pulley nut.

Torque: 900 kg-cm (65 ft-lb, 88 N·m)

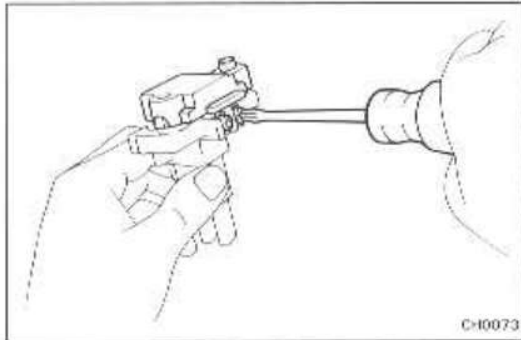
**5. ASSEMBLE DRIVE END FRAME AND RECTIFIER END FRAME**

- (a) Assemble the drive end frame and rectifier end frame.
- (b) [w/ Small Vacuum Pump]
Install the three through bolts.
[w/ Large Vacuum Pump]
Install the four through bolts.
- (c) Make sure the rotor rotates smoothly.

CH-16**CHARGING SYSTEM — Alternator**

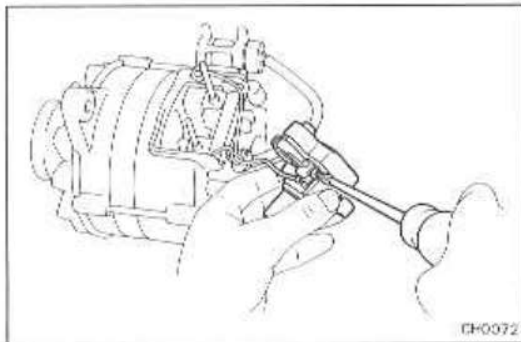
**6. [w/o IC REGULATOR]
INSTALL BRUSH HOLDER**

- (a) Install the brush holder with the nut.
- (b) Connect the lead wire to terminal B.

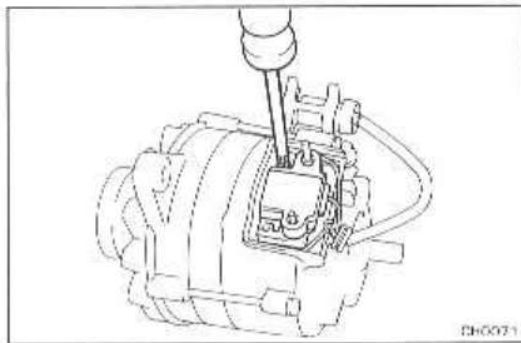


**[w/ IC REGULATOR]
INSTALL BRUSH HOLDER AND IC REGULATOR**

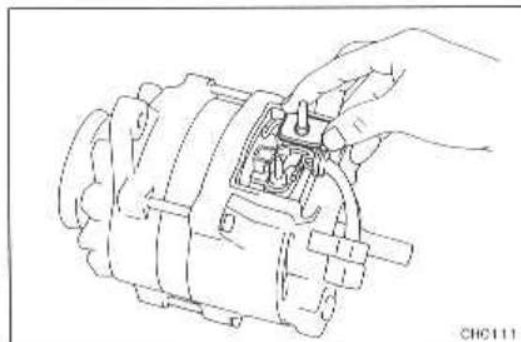
- (a) Install the IC regulator on the brush holder with the two screws.



- (b) Connect the white lead wire to the terminal of the IC regulator with the screw.



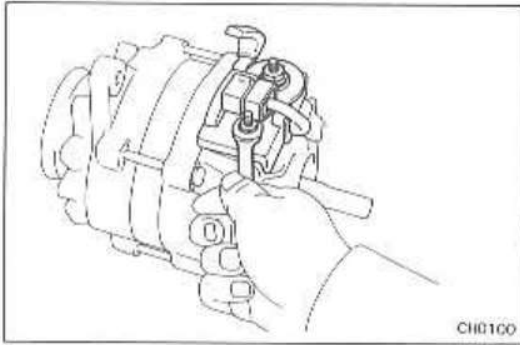
- (c) Install the brush holder and blue lead wire with the screw.



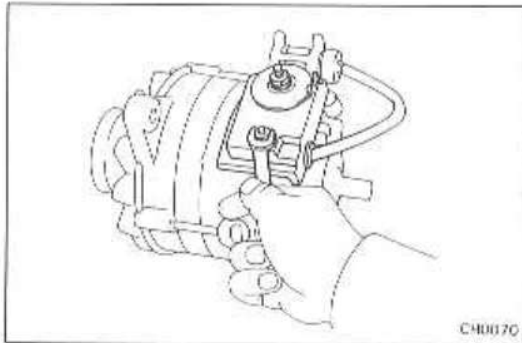
7. INSTALL BRUSH HOLDER COVER

[w/o IC Regulator]

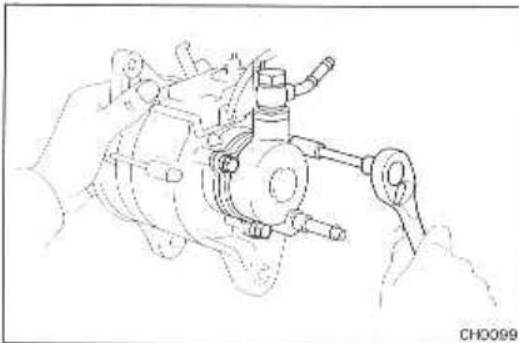
- (a) Place the insulator washer on terminal B.

CHARGING SYSTEM — Alternator**CH-17**

- (b) Place the cover on the rectifier end frame.
- (c) Place the terminal insulator and rubber washer on terminal B.
- (d) Place the wire clamp on terminal E.
- (e) Install the two nuts.

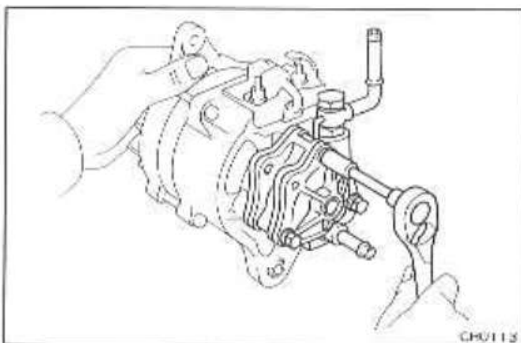
**[w/ IC Regulator]**

- (a) Place the cover on the rectifier end frame.
- (b) Place the terminal insulator and rubber washer on terminal B.
- (c) Install the two nuts.

**8. INSTALL VACUUM PUMP****[w/ Small Vacuum Pump]**

- (a) Place a new O-ring on the rectifier end frame.
- (b) Install the vacuum pump with the three bolts. Torque the bolts.

Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)

**[w/ Large Vacuum Pump]**

- (a) Place the felt on the rectifier end frame.
- (b) Install the vacuum pump with the three through bolts. Torque the bolts.

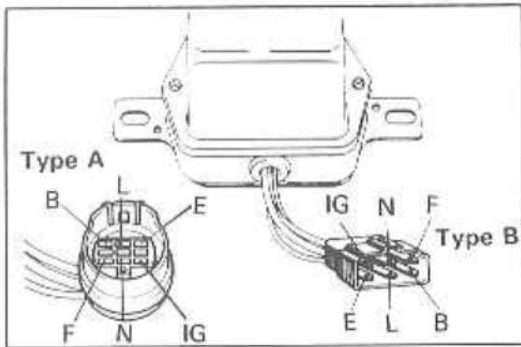
Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)

CH-18

CHARGING SYSTEM — Alternator Regulator

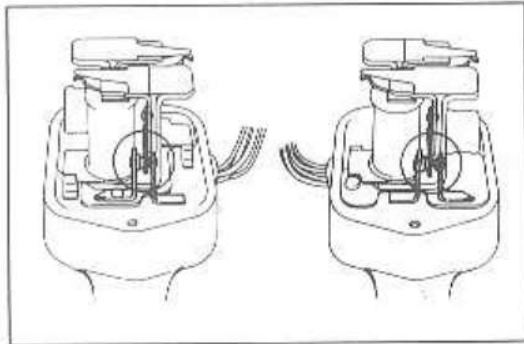
ALTERNATOR REGULATOR**INSPECTION OF ALTERNATOR REGULATOR**

1. DISCONNECT REGULATOR CONNECTOR
2. REMOVE TWO MOUNTING BOLTS AND REGULATOR



3. INSPECT POINT SURFACES FOR BURN OR DAMAGE

If defective, replace the regulator.

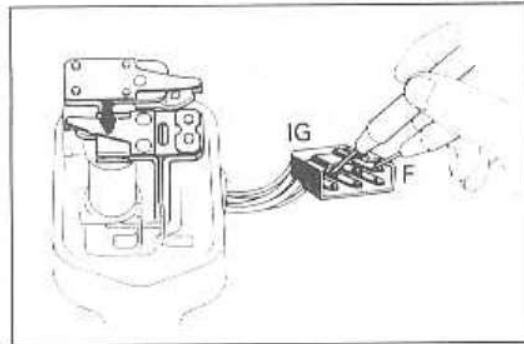


4. MEASURE RESISTANCE BETWEEN TERMINALS

- (a) Using an ohmmeter, measure the resistance between terminals IG and F.

Resistance (voltage regulator):

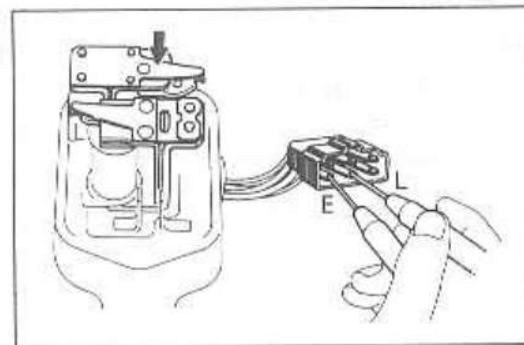
At rest 0 Ω
Pulled in Approx. 11 Ω



- (b) Using an ohmmeter, measure the resistance between terminals L and E.

Resistance (voltage relay):

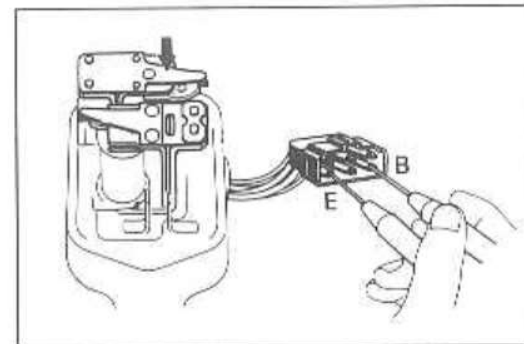
At rest 0 Ω
Pulled in Approx. 100 Ω

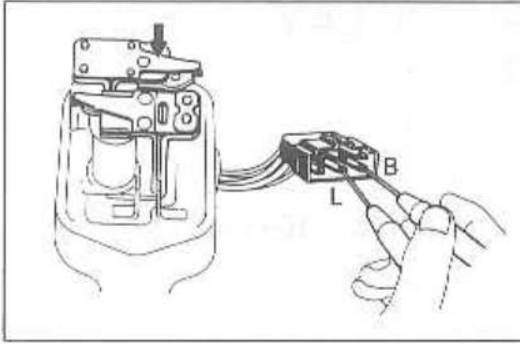


- (c) Using an ohmmeter, measure the resistance between terminals B and E.

Resistance (voltage relay):

At rest Infinity
Pulled in Approx. 100 Ω

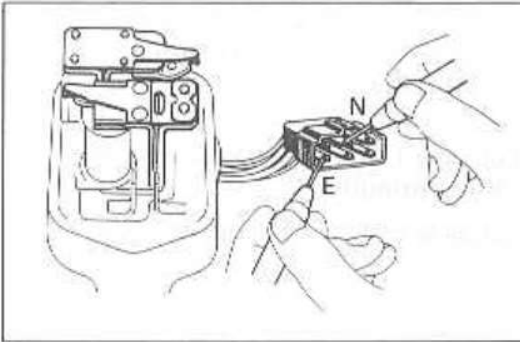


CHARGING SYSTEM — Alternator Regulator**CH-19**

- (d) Using an ohmmeter, measure the resistance between terminals B and L.

Resistance (voltage relay):

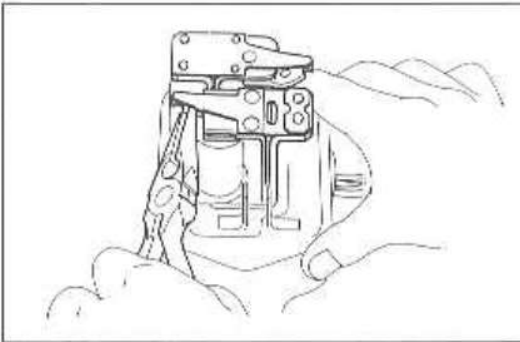
At rest	Infinity
Pulled in	0 Ω



- (e) Using an ohmmeter, measure the resistance between terminals N and E.

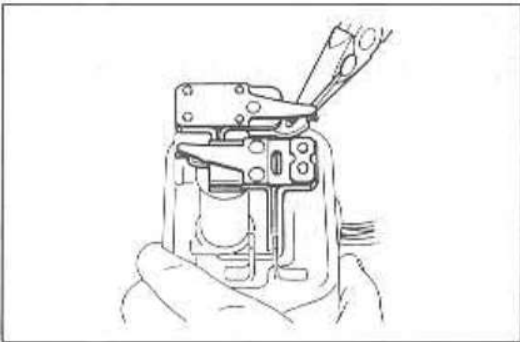
Resistance: Approx. 24 Ω

If any of the above checks are not as specified, replace the alternator regulator.

**VOLTAGE ADJUSTMENT OF ALTERNATOR REGULATOR**

1. TO ADJUST VOLTAGE REGULATOR, BEND REGULATOR ADJUSTING ARM

Regulating voltage: 13.8 – 14.8 V

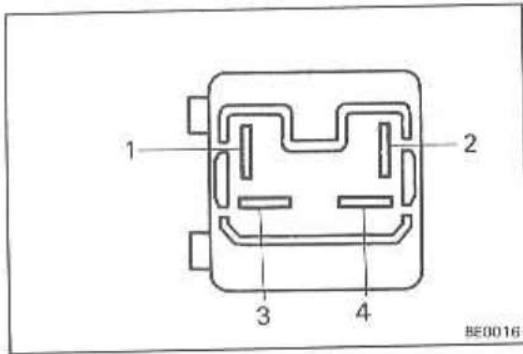


2. TO ADJUST VOLTAGE RELAY, BEND RELAY ADJUSTING ARM

Relay actuating voltage: 4.0 – 5.8 V

CH-20

CHARGING SYSTEM — Charge Light Relay, Main Relay



CHARGE LIGHT RELAY [w/ IC Regulator]

LOCATION: LHD In the left cowl.
RHD In the right cowl.

INSPECTION OF CHARGE LIGHT RELAY

INSPECT CHARGE LIGHT RELAY

Apply battery voltage between terminals 1, 2 and 3.

• 3 ↔ 4

Battery positive (+) terminal to terminal 1 and 2

Battery negative (-) terminal to terminal 3

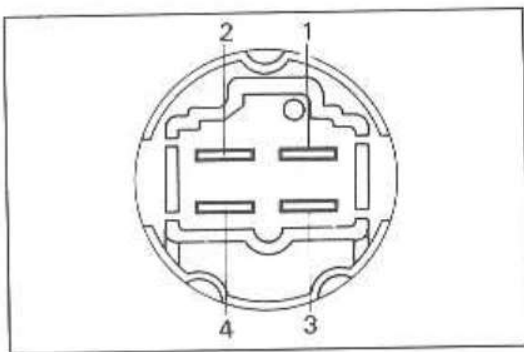
Continuity

Battery positive (+) terminal to terminal 1

Battery negative (-) terminal to terminal 3

No continuity

If continuity is not as specified, replace the relay.



MAIN RELAY [LH11 (ex. Indonesia), LH51, 61, 71, LX]

LOCATION

LH11: Under the instrument panel on the driver's side.

LH51, 61, 71: Under the instrument panel in the relay box.

LX: In the engine compartment relay box.

INSPECTION OF MAIN RELAY

INSPECT MAIN RELAY

(a) Using an ohmmeter, check for continuity between the following terminals:

• 1 ↔ 3 **Continuity**

• 2 ↔ 4 **No continuity**

(b) Apply battery voltage between terminals 1 and 3.

• 2 ↔ 4 **Continuity**

If continuity is not as specified, replace the relay.

