

CH-1

CHARGING SYSTEM

PRECAUTIONS	Page
CH-2	CH-2
TROUBLESHOOTING	CH-2
CH-3	CH-3
CHARGING SYSTEM CIRCUIT	CH-3
CH-4	CH-4
ON-VEHICLE INSPECTION	CH-4
CH-8	CH-8
ALTERNATOR (CV, CT, CE)	CH-8
CH-15	CH-15
ALTERNATOR (CM, CR)	CH-15
CH-21	CH-21
ALTERNATOR REGULATOR	CH-21
CH-23	CH-23
CHARGE LIGHT RELAY	CH-23
CH-24	CH-24
ENGINE MAIN RELAY (CE80, CV, CT)	CH-24
CH-25	CH-25
ENGINE MAIN RELAY (CE70, CM, CR)	CH-25

CH

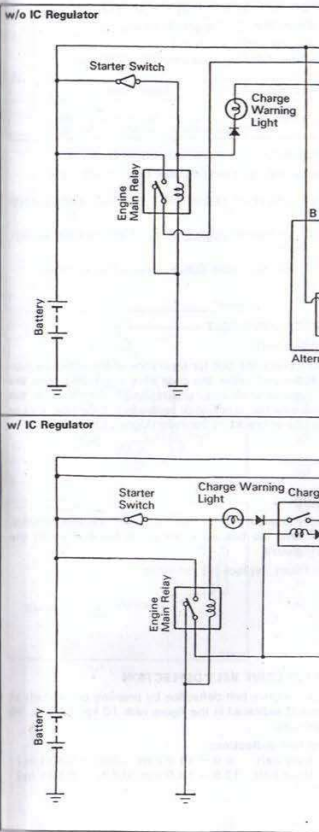
PRECAUTIONS

- 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

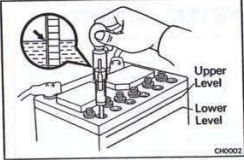
Problem	Possible cause	Remedy	Page
Charge warning light does not light with starter switch at "ON" and engine not running	Fuse blown	Check fuses: • Fuse: TURN-GAUGE IGN (Others) • Fuse: CHARGE • Fuse: ENGINE	CH-3
	Light burned out	Replace light	
	Wiring connection loose	Tighten loose connections	
	Alternator regulator faulty	Check regulator	CH-21
	Charge light relay	Check relay	CH-23
Charge warning light does not go out when engine running (battery requires frequent recharging)	IC regulator faulty	Replace IC regulator	CH-9
	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: • Fuse: ENGINE	CH-3
	Engine main relay faulty	Check engine main relay	CH-24 or 25
	Fusible link blown	Replace fusible link	
	Alternator regulator, charge light relay, IC regulator or alternator faulty	Check charging system	CH-4
	Wiring faulty	Repair wiring	

CHAR

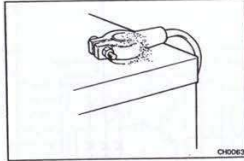


CH-4

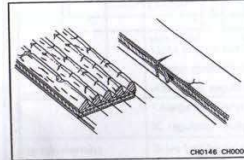
CHARGING SYSTEM — On-Vehicle Inspection



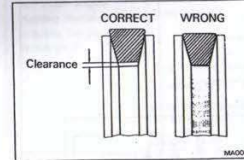
CH0003



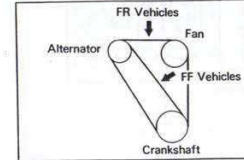
CH0003



CH0146 CH0004



MA0035



FR Vehicles
FF Vehicles
Alternator
Fan
Crankshaft

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)

Specific gravity	Battery models
1.27 - 1.29	NT 80 - 56(S) NX110 - 5, NX110 - 5L, NX110 - 5L - MF, NX120 - 7, NX120 - 7L, NX120 - 7L - MF

(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 links and fuses for continuity.

3. INSPECT DRIVE BELT

(V-ribbed belt)

Visually check the belt for separation of the adhesive rubber above and below the core, core separating from the belt side, severed core, separation of the rib from the adhesive rubber, cracking or separation of the ribs, torn or worn ribs or cracks in the inner ridges of the ribs.

(V-belt)

Visually check the drive belt for cracks, oiliness or wear. Check that the belt does not touch the bottom of the pulley groove.

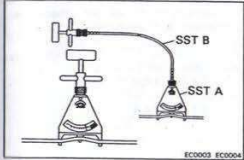
If necessary, replace the drive belt.

4. INSPECT DRIVE BELT DEFLECTION

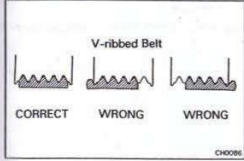
Check the drive belt deflection by pressing on the belt at the points indicated in the figure with 10 kg (22.0 lb, 98 N) pressure.

Drive belt deflection:
New belt 9.0 - 11.0 mm (0.354 - 0.433 in.)
Used belt 12.0 - 14.0 mm (0.472 - 0.551 in.)

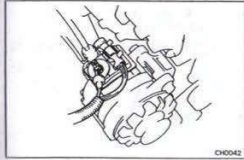
CHARGING SYSTEM —



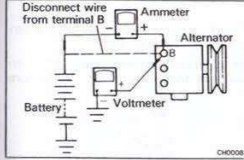
EC0003 EC0004



CH0006



CH0042



CH0008

[Ref]
Using
SST
SST
Drive

NOT
• "p
th
• "t
ru
• A!
in

5. VISI
LIST
(a)
(b)

6. INSI
(a)
(b)
(c)
(d)
If th
troul

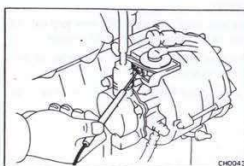
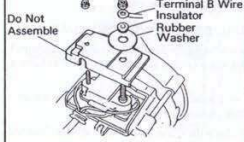
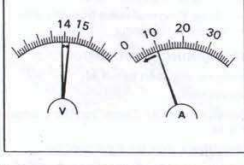
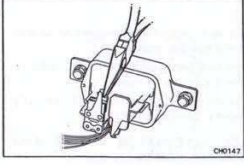
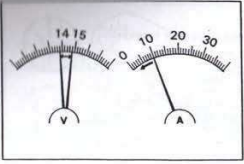
7. INSI
NOT
the 1
instr
(a)

https://cardiagn.com/charging-c-engine/

3/13

CH-6

CHARGING SYSTEM — On-Vehicle Inspection



(b) Check the amperage and voltage.
With the engine running at 2,000 rpm, check the reading on the ammeter and voltmeter.

[w/o IC Regulator]
Standard amperage: Less than 10 A
Standard voltage: 13.8 – 14.8 V
(CE OPT: Cold area of the Europe)
13.8 – 14.4 V

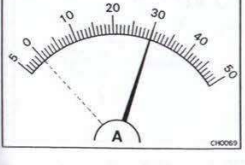
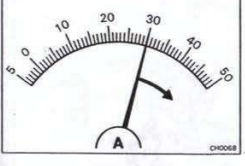
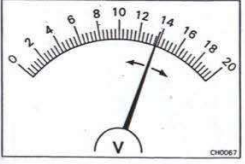
If the voltage reading is greater than standard voltage, adjust the regulator or replace it.
If the voltage reading is less than 13.8 V, check the alternator.

[w/ IC Regulator]
Standard amperage: Less than 10 A
Standard voltage: 13.8 – 14.4 V
If the voltage reading is greater than 14.4 V, replace the IC regulator.

If the voltage reading is less than 13.8 V, check the alternator as follows:
• Remove the brush holder cover and connect the terminal B wire in the original position.
CAUTION: There is battery voltage applied to terminal B so disconnect the battery terminal before beginning work.

• With the engine running at 2,000 rpm, connect terminal F to body ground.

CHARGING SYSTEM —



If the voltage reading is greater than standard voltage, adjust the regulator or replace it.
If the voltage reading is less than 13.8 V, check the alternator.

8. CHECK
(a) Voltage
(b) Current
Stand

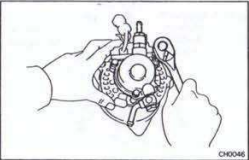
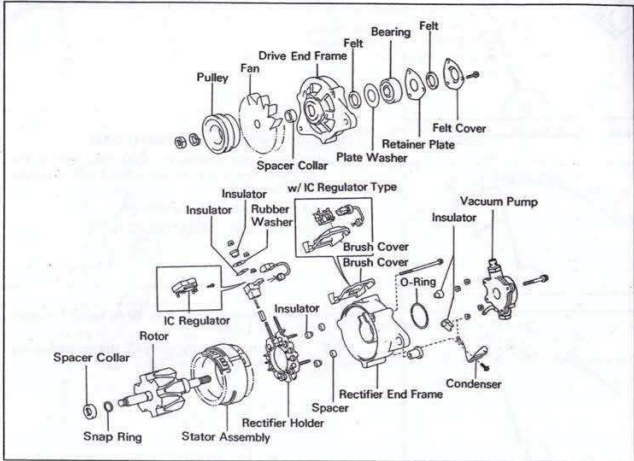
If the voltage reading is less than 13.8 V, check the alternator as follows:
• Remove the brush holder cover and connect the terminal B wire in the original position.
CAUTION: There is battery voltage applied to terminal B so disconnect the battery terminal before beginning work.

• With the engine running at 2,000 rpm, connect terminal F to body ground.

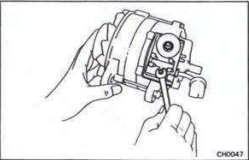
<https://cardiagn.com/charging-c-engine/>

4/13

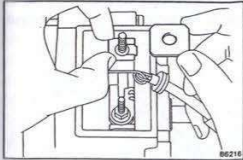
ALTERNATOR (CV, CT, CE)
COMPONENTS



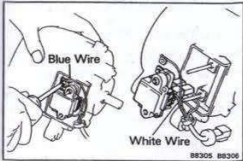
DISASSEMBLY OF ALTERNATOR
1. REMOVE VACUUM PUMP
Remove three bolts and vacuum pump with the O-ring.



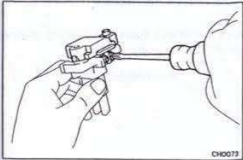
2. REMOVE BRUSH COVER
Remove two nuts, insulator, rubber washer, wire clamp and brush cover.



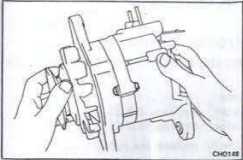
3. REM
[w/c
(a)
(b)



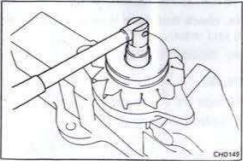
[w/
(a)
(b)



(c)

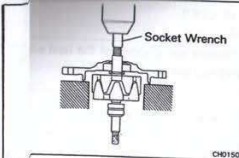


4. REM
(a)
(b)
NOTI
plast



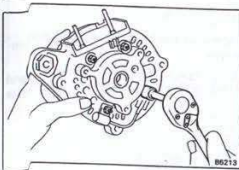
5. REM
(a)
(b)

CH-11 CHARGING SYSTEM — Alternator

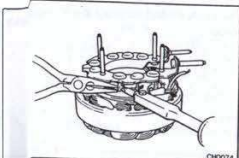


Socket Wrench
CH0150

6. REMOVE ROTOR FROM DRIVE END FRAME
Using a press and socket wrench, press out the rotor and spacer collars.



7. REMOVE RECTIFIER END FRAME FROM STATOR AND RECTIFIER HOLDER
(a) Remove the two rubber caps.
(b) Remove the four nuts, condenser and two insulators.
(c) Remove the rectifier end frame from the stator.
(d) Remove the two insulators and two collars from the rectifier holder studs.



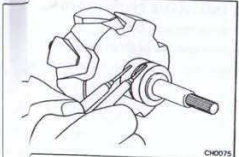
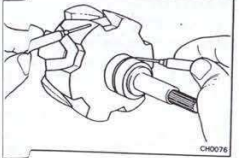
8. UNSOLDER STATOR LEADS FROM RECTIFIER HOLDER
CAUTION: Protect rectifiers from heat using pliers and small wattage soldering iron.

INSPECTION OF ALTERNATOR Rotor

1. INSPECT ROTOR FOR OPEN CIRCUIT
Using an ohmmeter, check for continuity between three slip rings.
Standard resistance:
w/ IC regulator Approx. 2.9 Ω
w/o IC regulator Approx. 4.0 Ω
If there is no continuity, replace the rotor.

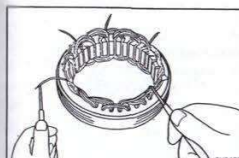
2. INSPECT THAT ROTOR IS NOT GROUNDED
Using an ohmmeter, check that there is no continuity between the slip ring and rotor.
If there is continuity, replace the rotor.

3. INSPECT SLIP RINGS
Check that the slip rings are not rough or scored.
If rough or scored, replace the rotor.

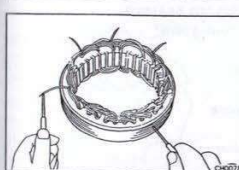



CH0075 CH0076

CHARGING SYSTEM — Stator



1. INSPECT STATOR FOR OPEN CIRCUIT
Using an ohmmeter, check for continuity between the stator windings.
If there is no continuity, replace the stator.

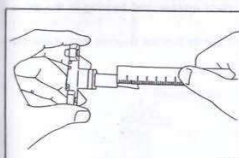
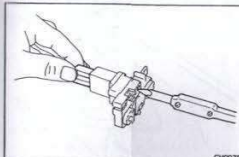
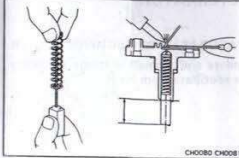


2. INSPECT STATOR FOR SHORT TO GROUND
Using an ohmmeter, check that there is no continuity between the stator windings and ground.
If there is continuity, replace the stator.

Brush and Commutator

1. MEASURE BRUSH AND COMMUTATOR
Using a micrometer, measure the brush and commutator.
If the measurement is outside the specified range, replace the brush and commutator.

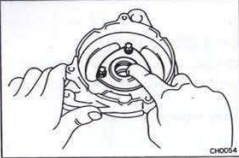
2. IF NECESSARY, REPLACE THE BRUSH AND COMMUTATOR

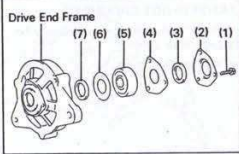
CH0077 CH0078 CH0079 CH0080 CH0081

CH-12

CHARGING SYSTEM — Alternator

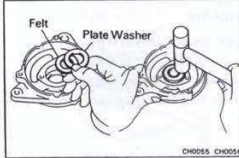


CH0054



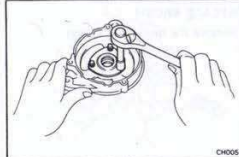
Drive End Frame
(7) (6) (5) (4) (3) (2) (1)

CH0055

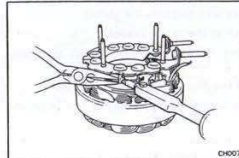


Felt Plate Washer

CH0056



CH0057



CH0074

Bearing

1. INSPECT BEARING

Check that the bearing is not rough or worn.
If necessary, replace the bearing.

2. IF NECESSARY, REPLACE BEARING

(a) Remove the following parts:

(1) Screws
(2) Felt cover
(3) Felt
(4) Retainer plate
(5) Bearing
(6) Plate washer
(7) Felt

(b) Install the felt, plate washer and bearing in the drive and frame.

NOTE: If necessary, lightly tap the bearing with a plastic hammer.

(c) Install the retainer plate, felt and felt cover with the three bolts.

ASSEMBLY OF ALTERNATOR

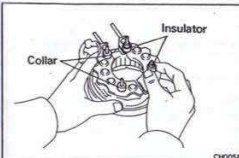
(See page CH-8)

1. SOLDER EACH STATOR LEAD TO RECTIFIER HOLDER

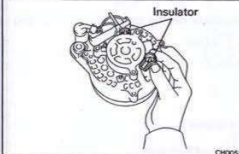
CAUTION: Use pliers and a small wattage soldering iron to protect the rectifiers from heat.

CHARGING SYSTEM

2. ASSEMBLY OF ALTERNATOR

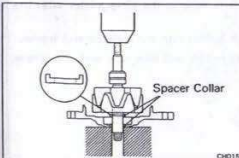


CH0058



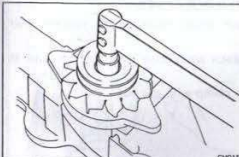
Insulator

CH0059

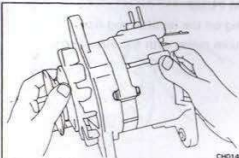


Spacer Collar

CH0151



CH0152



CH0148

2. ASSEMBLY OF ALTERNATOR

(a) P
(b) P
(c) Ir
C

(d) P
(e) Ir
(f) Ir

3. INSTALLATION OF ALTERNATOR

(a) S
(b) L
v

4. INSTALLATION OF ALTERNATOR

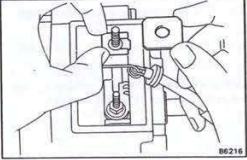
(a) H
(b) S
(c) Ir
Torqu

5. ASSEMBLY OF ALTERNATOR

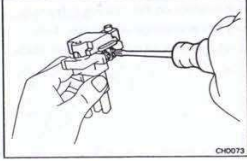
(a) Ir
(b) H

CH-14

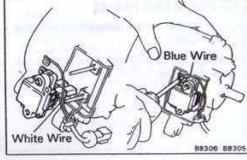
CHARGING SYSTEM — Alternator



86216



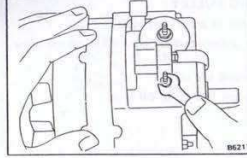
CH0073



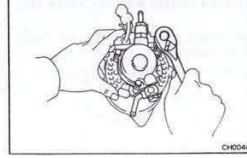
89306-89305

Blue Wire

White Wire



86217



CH0046

6. INSTALL BRUSH HOLDER

[w/o IC Regulator]

(a) Install the brush holder to the rectifier end frame with a nut.

(b) Install the lead wire and insulator.

[w/ IC Regulator]

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

(b) Connect the white wire to the IC regulator with the screw.

(c) Insert the brush holder into the rectifier end frame.

(d) Install the brush holder and blue wire with the screw.

7. INSTALL BRUSH HOLDER COVER

(a) Place the brush holder cover on the rectifier end frame.

(b) Install the insulator and rubber washer to terminal B with the nut.

(c) Install the wire clamp with the nut.

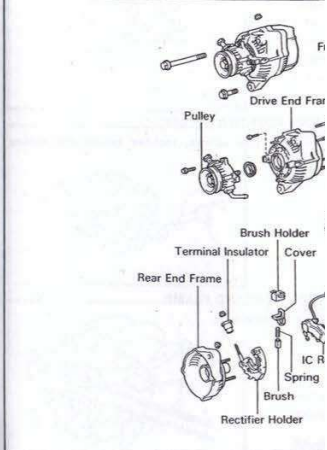
8. INSTALL VACUUM PUMP

(a) Place the O-ring on the rectifier end frame.

(b) Install the vacuum pump with the three bolts.

CHARGING SYSTEM

ALTER
COMPO



F4204

Drive End Frame

Pulley

Brush Holder

Terminal Insulator

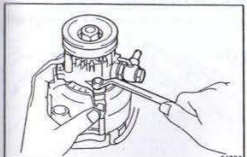
Rear End Frame

IC Regulator

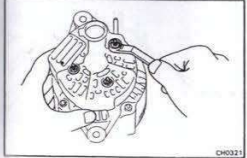
Spring

Brush

Rectifier Holder



F4204



CH0323

DISASS

1. REMOVE

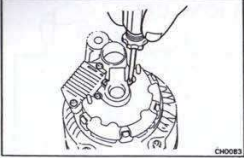
2. REMOVE

(a) I

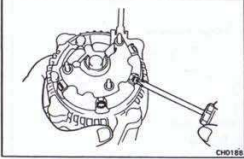
(b) I

CH-16

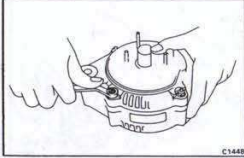
CHARGING SYSTEM — Alternator



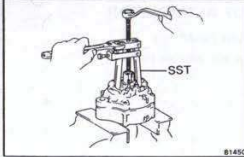
CH0083



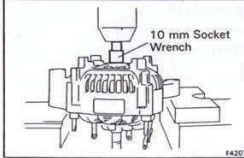
CH0185



C1449



B1450



F4307

3. REMOVE BRUSH HOLDER AND IC REGULATOR

Remove the five screws, brush holder and IC regulator.

4. REMOVE RECTIFIER HOLDER

Remove the four screws, rectifier holder and rubber insulators.

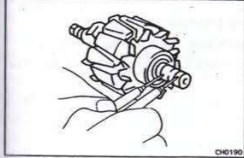
5. REMOVE REAR END FRAME

Remove the four nuts.

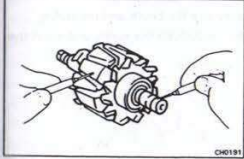
6. REMOVE ROTOR FROM DRIVE END FRAME

Using SST and a press, remove the rotor from drive end frame.
SST 09286-46011

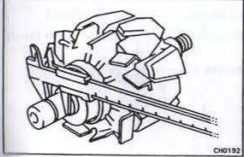
CHARGING SYS1



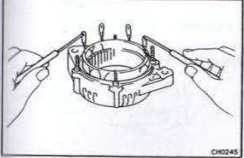
CH0190



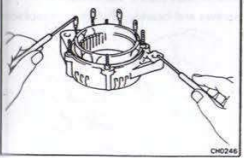
CH0191



CH0192



CH0245



CH0246

INSPEI
Rotor

1. INS
Usir
ring
Star
If th

2. INS
Usin
two
the

3. INS
(a)
(b)
If th
repl
Star
Min

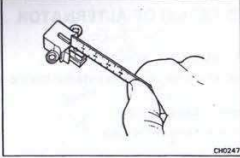
Stator

1. INS
Usin
is nc

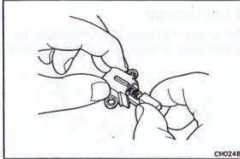
2. INS
Usin
two
If th
ly.

CH-18

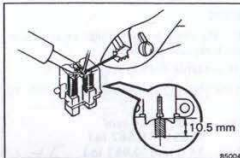
CHARGING SYSTEM — Alternator



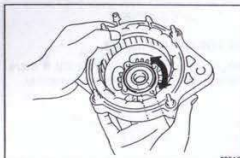
CH0247



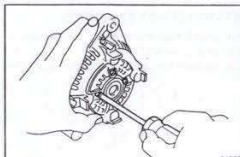
CH0248



85504



F2513



84209

Brush and Brush Holder

1. MEASURE EXPOSED BRUSH LENGTH

Minimum exposed length: 4.5 mm (0.177 in.)

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

2. IF NECESSARY, REPLACE BRUSH

(a) Unsolder and remove the brush and the spring.

(b) Put the brush wire through the spring and insert the brush holder.

(c) Solder the wire to the brush holder as shown.

Standard 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.

Bearings

1. INSPECT FRONT BEARING

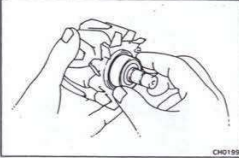
Check that the front bearing is not rough or worn.

If necessary, replace the bearing.

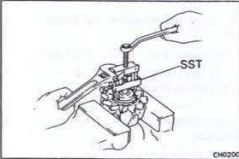
2. IF NECESSARY, REPLACE FRONT BEARING

Remove the four screws and bearing retainer, and replace the front bearing.

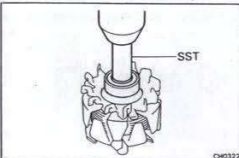
CHARGING SYSTEM



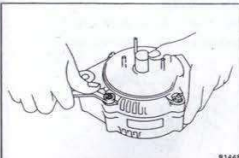
CH0189



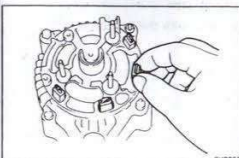
CH0200



CH0322



81449



CH0581

3. INSP

Check

If nec

4. IF NE

(a)

SST

CAU

(b)

SST

ASSEM

(See pag

1. INST

2. INST

(a)

(b)

3. INST

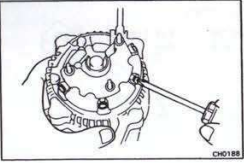
(a)

<https://cardiagn.com/charging-c-engine/>

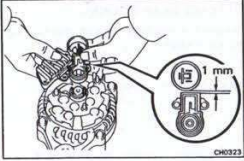
10/13

CH-20

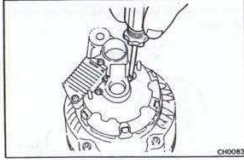
CHARGING SYSTEM — Alternator



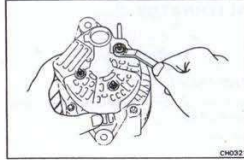
CH0189



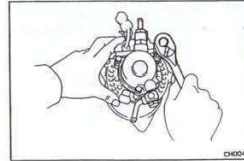
CH0223



CH0093



CH0321



CH0046

(b) Install the rectifier with four screws.

4. INSTALL BRUSH HOLDER AND IC REGULATOR

(a) Temporarily install the IC regulator and brush holder with the screw.

(b) Place the brush holder cover to the brush holder.

(c) Install the IC regulator and brush holder to the rear end frame as shown in the figure.

NOTE:

- Make sure the brush holder's cover doesn't slip to one side during installation.
- Make sure the gap between the brush holder and connector is at least 1 mm (0.04 in.).

(d) Install the brush holder and IC regulator with the five screws.

5. INSTALL REAR END COVER

(a) Install the end cover with the three nuts.

(b) Install the terminal insulator with the nut.

6. INSTALL VACUUM PUMP

Install the vacuum pump with the four bolts.

CHARGING SYSTEM —

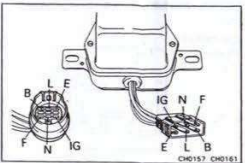
ALTERNATOR INSPECTION

1. DISCONNECT BATTERY

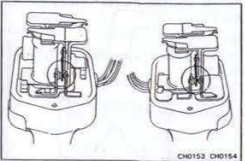
2. REMOVE ALTERNATOR

3. INSPECT DAMAGED PARTS. If defective, replace.

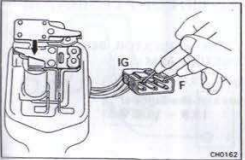
4. MEASURE RESISTANCE (a) L to t Resistor A P (b) L to t Resistor A P (c) L to t Resistor A P



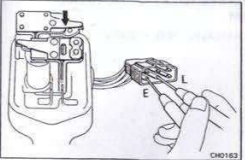
CH0157 CH0151



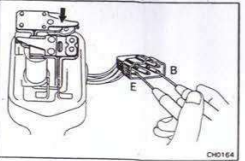
CH0152 CH0154



CH0162



CH0163



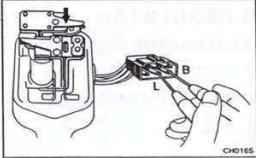
CH0164

<https://cardiagn.com/charging-c-engine/>

11/13

CH-22

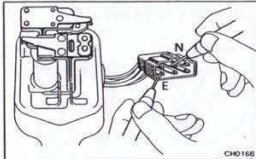
CHARGING SYSTEM — Alternator Regulator



(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

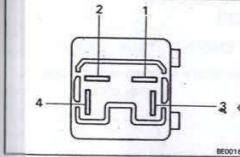
Regulating voltage: 13.8 – 14.8 V
(CE OPT: Cold area of the Europe)
13.8 – 14.4 V

2. TO ADJUST VOLTAGE RELAY, BEND RELAY ADJUSTING ARM

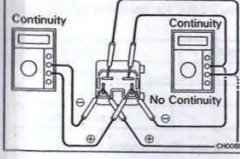
Relay actuating voltage: 4.0 – 5.8 V

CHARGING SYSTEM -

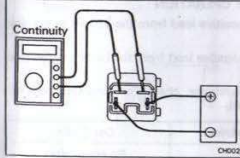
CHAR (w/ IC) INSPEC LOC/



1. INSP (a) (b) (c) If co

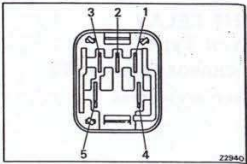


2. INSP (a) (b) (c) If the



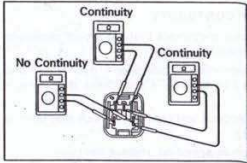
CH-24

CHARGING SYSTEM — Engine Main Relay



**ENGINE MAIN RELAY
(CE80, CV, CT)**
INSPECTION OF ENGINE MAIN RELAY

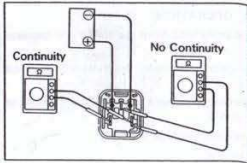
LOCATION: In the engine compartment relay box.



1. **INSPECT RELAY CONTINUITY**
Using an ohmmeter, check for continuity between each terminal.

Between terminals	Condition
1 - 3	Continuity
2 - 4	Continuity
4 - 5	No continuity

If continuity is not as specified, replace the relay.

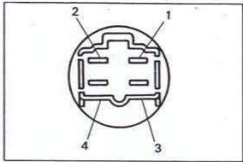


2. **INSPECT RELAY OPERATION**
(a) Connect a positive lead from the battery to terminal 3.
(b) Connect a negative lead from the battery to terminal 1.
(c) Using an ohmmeter, check for continuity between each terminal.

Between terminal	Condition
2 - 4	No continuity
4 - 5	Continuity

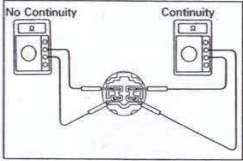
If continuity is not as specified, replace the relay.

CHARGING SYSTEM -

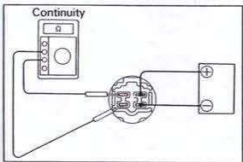


**ENGINE
(CE70)**
INSPEC

LOCA
CE70
CM, (



1. **INSP**
(a) |
(b) |
If cor



2. **INSP**
(a) |
(b) |
If the