

STARTING & CHARGING SYSTEM

SECTION SC

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PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

NDSC0001

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.

Information necessary to service the system safely is included in the **RS section** of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance should be performed by an authorized NISSAN dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the RS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow harness connectors.

Wiring Diagrams and Trouble Diagnosis

NDSC0002

When you read wiring diagrams, refer to the following:

- **GI-10**, "HOW TO READ WIRING DIAGRAMS"
- **EL-10**, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

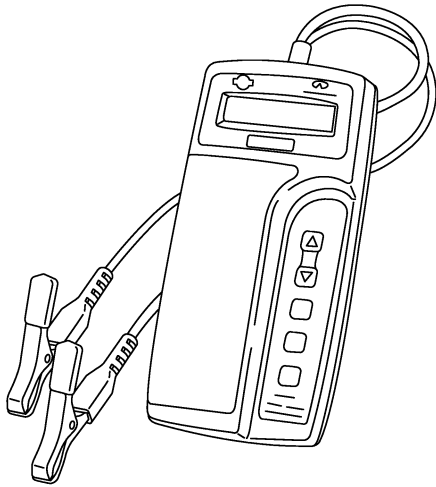
- **GI-33**, "How to Follow Test Groups in Trouble Diagnoses"
- **GI-22**, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"

PREPARATION

Special Service Tool

Special Service Tool

NDSC0017

Tool number Tool name	Description
J-44373 Model 620 Battery/Starting/Charging system tester	 <p data-bbox="435 856 516 884">SEL403X</p>

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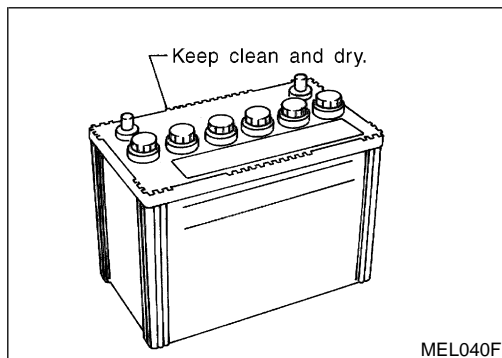
BATTERY

How to Handle Battery

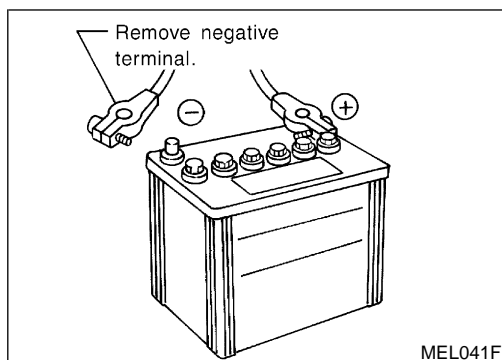
NDSC0003

CAUTION:

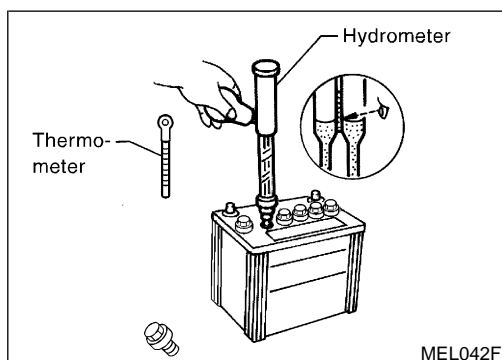
- If it becomes necessary to start the engine with a booster battery and jumper cables, use a 12-volt booster battery.
- After connecting battery cables, ensure that they are tightly clamped to battery terminals for good contact.
- Never add distilled water through the hole used to check specific gravity.



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MEL041F



MEL042F

METHODS OF PREVENTING OVER-DISCHARGE

NDSC0003S01

The following precautions must be taken to prevent over-discharging a battery.

- The battery surface (particularly its top) should always be kept clean and dry.
- The terminal connections should be clean and tight.
- At every routine maintenance, check the electrolyte level. This also applies to batteries designated as "low maintenance" and "maintenance-free".
- When the vehicle is not going to be used over a long period of time, disconnect the negative battery terminal. (If the vehicle has an extended storage switch, turn it off.)
- Check the charge condition of the battery. Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.

CHECKING ELECTROLYTE LEVEL

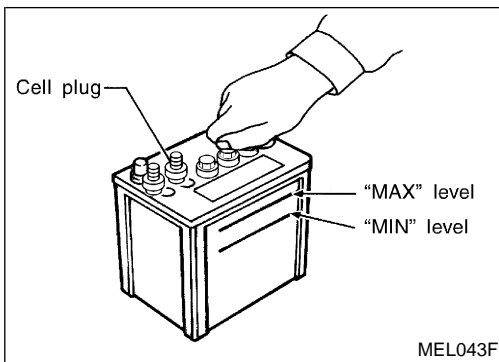
NDSC0003S02

WARNING:

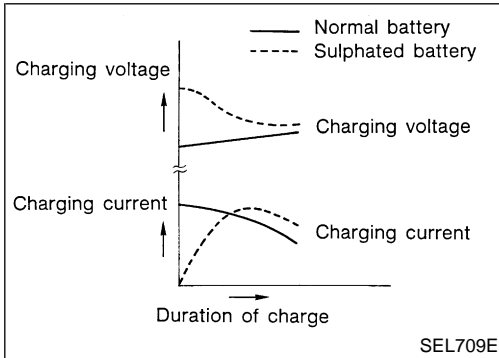
Do not allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, do not touch or rub your eyes until you have thoroughly washed your hands. If acid contacts eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

BATTERY

How to Handle Battery (Cont'd)



- Remove the cell plug using a suitable tool.
- Add distilled water up to the MAX level.



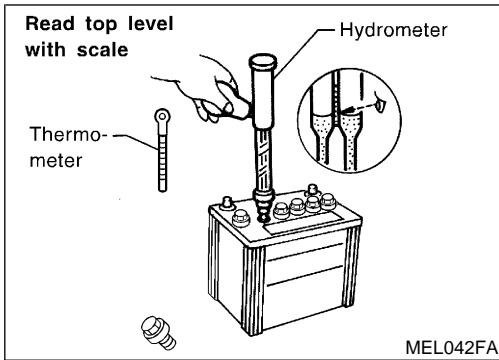
Sulphation

NDSC0003S0201

A battery will be completely discharged if it is left unattended for a long time and the specific gravity will become less than 1.100. This may result in sulphation on the cell plates.

To determine if a battery has been "sulphated", note its voltage and current when charging it. As shown in the figure, less current and higher voltage are observed in the initial stage of charging sulphated batteries.

A sulphated battery may sometimes be brought back into service by means of a long, slow charge, 12 hours or more, followed by a battery capacity test.



SPECIFIC GRAVITY CHECK

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1. Read hydrometer and thermometer indications at eye level.

2. Use the chart below to correct your hydrometer reading according to electrolyte temperature.

Hydrometer Temperature Correction

NDSC0003S0301

Battery electrolyte temperature °C (°F)	Add to specific gravity reading
71 (160)	0.032
66 (150)	0.028
60 (140)	0.024
54 (129)	0.020
49 (120)	0.016
43 (110)	0.012
38 (100)	0.008
32 (90)	0.004
27 (80)	0
21 (70)	-0.004
16 (60)	-0.008
10 (50)	-0.012

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BATTERY

How to Handle Battery (Cont'd)

Battery electrolyte temperature °C (°F)	Add to specific gravity reading
4 (39)	-0.016
-1 (30)	-0.020
-7 (20)	-0.024
-12 (10)	-0.028
-18 (0)	-0.032

Corrected specific gravity	Approximate charge condition
1.260 - 1.280	Fully charged
1.230 - 1.250	3/4 charged
1.200 - 1.220	1/2 charged
1.170 - 1.190	1/4 charged
1.140 - 1.160	Almost discharged
1.110 - 1.130	Completely discharged

CHARGING THE BATTERY

NDSC0003S04

CAUTION:

- Do not “quick charge” a fully discharged battery.
- Keep the battery away from open flame while it is being charged.
- When connecting the charger, connect the leads first, then turn on the charger. Do not turn on the charger first, as this may cause a spark.
- If battery electrolyte temperature rises above 60°C (140°F), stop charging. Always charge battery at a temperature below 60°C (140°F).

Charging Rates

NDSC0003S0401

Amps	Time
50	1 hour
25	2 hours
10	5 hours
5	10 hours

Do not charge at more than 50 ampere rate.

NOTE:

The ammeter reading on your battery charger will automatically decrease as the battery charges. This indicates that the voltage of the battery is increasing normally as the state of charge improves. The charging amps indicated above refer to initial charge rate.

- If, after charging, the specific gravity of any two cells varies more than .050, the battery should be replaced.

BATTERY

Trouble Diagnoses with Battery/Starting/Charging System Tester

Trouble Diagnoses with Battery/Starting/Charging System Tester

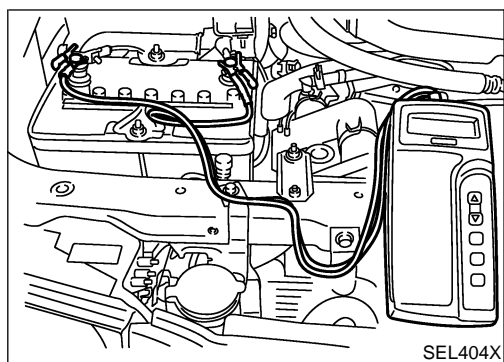
NDS0018

CAUTION:

When working with batteries, always wear appropriate eye protection.

NOTE:

- To ensure a complete and thorough diagnosis, the battery, starter and generator test segments must be done as a set from start to finish.
- If battery surface charge is detected while testing, the tester will prompt you to turn on the headlights to remove the surface charge.
- If necessary, the tester will prompt you to determine if the battery temperature is above or below 0°C (32°F). Choose the appropriate selection by pressing the up or down arrow button, then press “ENTER” to make the selection.

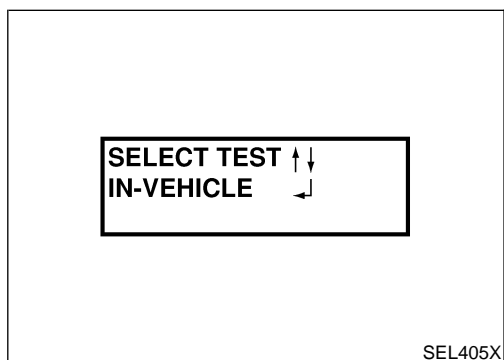


1. Turn off all loads on the vehicle electrical system. Clean or repair as necessary.
2. Visually inspect the battery, battery terminals and cable ends with ignition switch in “OFF” position.

NOTE:

The contact surface between the battery terminals, cable ends and tester leads must be clean for a valid test. A poor connection will prevent testing and a “CHECK CONNECTION” message will appear during the test procedures. If this occurs, clean the battery post and terminals, reconnect them and restart the test.

3. Connect the red tester lead clamp to the positive battery terminal, and the black to the negative terminal.



4. The tester will turn on automatically. Using the arrow keys, select “IN-VEHICLE” on the tester and then press the “ENTER” key.

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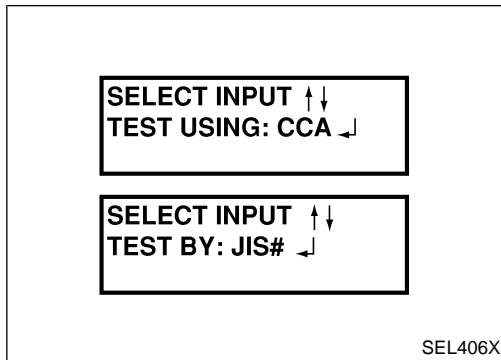
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BATTERY

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)



5. Locate the battery type and rating stamped or written on the top case of the battery to be tested.

NOTE:

The battery type and rating will have either of the following.

CCA: Cold Cranking Amps (490 CCA, 550 CCA, etc.)

JIS: Japanese Industrial Standard.

Battery is stamped with a number such as:

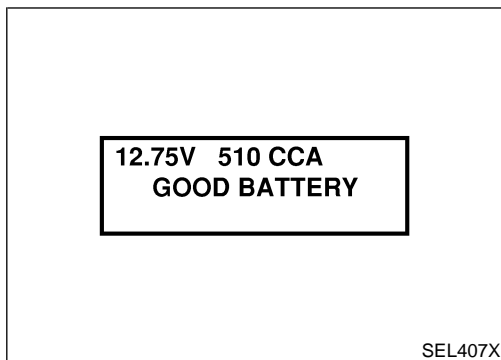
80D26L: 80 (rank of output), D (physical size-depth), 26 (width in cm). The last character L (post configuration) is not input into the tester.

The tester requires the rating for the battery be entered exactly as it is written or stamped on the battery. Do not attempt a CCA conversion for JIS stamped batteries. JIS must be input directly.

6. Using the arrow and "ENTER" keys alternately, select the battery type and rating.

NOTE:

The tester lists five choices; CCA, JIS, IEC, DIN, and EN. Only use CCA or JIS.



7. Press "ENTER" to begin the test. Diagnosis results are displayed on the tester. Refer to "DIAGNOSTIC RESULT ITEM CHART", SC-9.



8. Press "ENTER", then test output code is displayed. Record the test output code on the repair order.
9. Toggle back to the "DIAGNOSTIC SCREEN" for test results.

NOTE:

- If necessary, the tester will ask the user to determine if the battery has just been charged. Choose the appropriate selection by pressing the up or down arrow button and then press the "ENTER" button to make the selection.
- When testing a battery installed in a vehicle that has recently been driven, select "BEFORE CHARGE".
- If the battery has just been slow charged due to a "CHARGE & RETEST" decision by the tester, and the tester asks the user "BEFORE CHARGE/AFTER CHARGE", select "AFTER CHARGE".

BATTERY

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

DIAGNOSTIC RESULT ITEM CHART

NDSC0018S01

Diagnostic item	Service procedure	GI
GOOD BATTERY	Battery is OK. Refer to "Trouble Diagnoses with Battery/Starting/Charging System Tester", SC-7.	MA
REPLACE BATTERY	Replace battery. Before replacing battery, clean the battery cable clamps and battery posts. Perform battery test again with Battery/Starting/Charging system tester. If second test result is "Replace Battery", then do so. Perform battery test again to confirm repair.	EM
BAD CELL-REPLACE	Replace the battery. Perform battery test again with Battery/Starting/Charging system tester to confirm repair.	LC
GOOD-RECHARGE	Perform the slow battery charging procedure. (Initial rate of charge is 10A for 12 hours.) Perform battery test again with Battery/Starting/Charging system tester.	EC
CHARGE & RETEST	Perform the slow battery charging. (Initial rate of charge is 10A for 12 hours.) Perform battery test again with Battery/Starting/Charging system tester to confirm repair. NOTE: If the tester asks the user "BEFORE CHARGE/AFTER CHARGE", select "AFTER CHARGE".	FE

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STARTING SYSTEM

System Description

System Description

NDSC0004

Power is supplied at all times:

- through 30A fusible link (letter **k**, located in the fuse and fusible link box)
- to ignition switch terminal 1.

With the ignition switch in the START position, power is supplied:

- from ignition switch terminal 5
- to park/neutral position (PNP) relay terminal 7.

With the ignition switch in the ON or START position, power is supplied:

- through 10A fuse (No. 30, located in the fuse block)
- to park/neutral position (PNP) switch terminal 2.

FOR MODELS WITH VEHICLE SECURITY SYSTEM

NDSC0004S03

With the selector lever in the P or N position, power is supplied:

- from park/neutral position (PNP) switch terminal 1
- to vehicle security relay terminal 4
- through vehicle security relay terminal 3
- to park/neutral position (PNP) relay terminal 1.

If the vehicle security system is triggered, ground is supplied to vehicle security relay terminal 1. This removes power to park/neutral position (PNP) relay terminal 1, which disengages the park/neutral position (PNP) relay and the starter motor will not operate.

FOR MODELS WITHOUT VEHICLE SECURITY SYSTEM

NDSC0004S04

With the selector lever in the P or N position, power is supplied:

- from park/neutral position (PNP) switch terminal 1
- to park/neutral position (PNP) relay terminal 1.

Ground is supplied to park/neutral position (PNP) relay terminal 2, through body grounds E3, E30 and E50. With power and ground supplied, the park/neutral position (PNP) relay is energized and power is supplied:

- from park/neutral position (PNP) relay terminal 6
- to starter motor windings terminal S.

The starter motor plunger closes and provides a closed circuit between the battery and starter motor. The starter motor is grounded through the engine block. With power and ground supplied, cranking occurs and the engine starts.

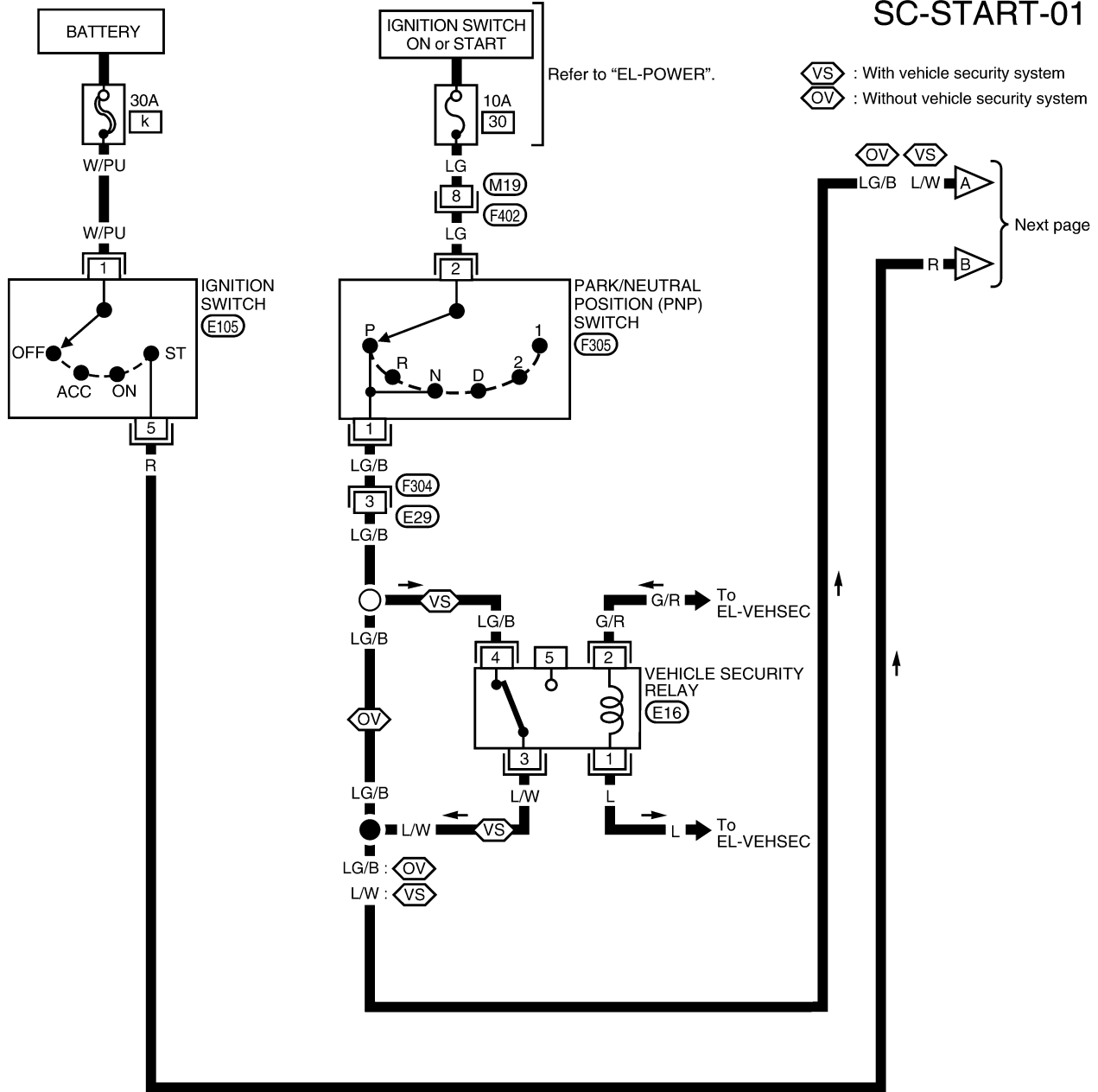
STARTING SYSTEM

Wiring Diagram — START —

Wiring Diagram — START —

NDSC0005

SC-START-01



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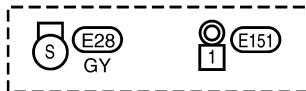
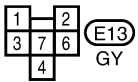
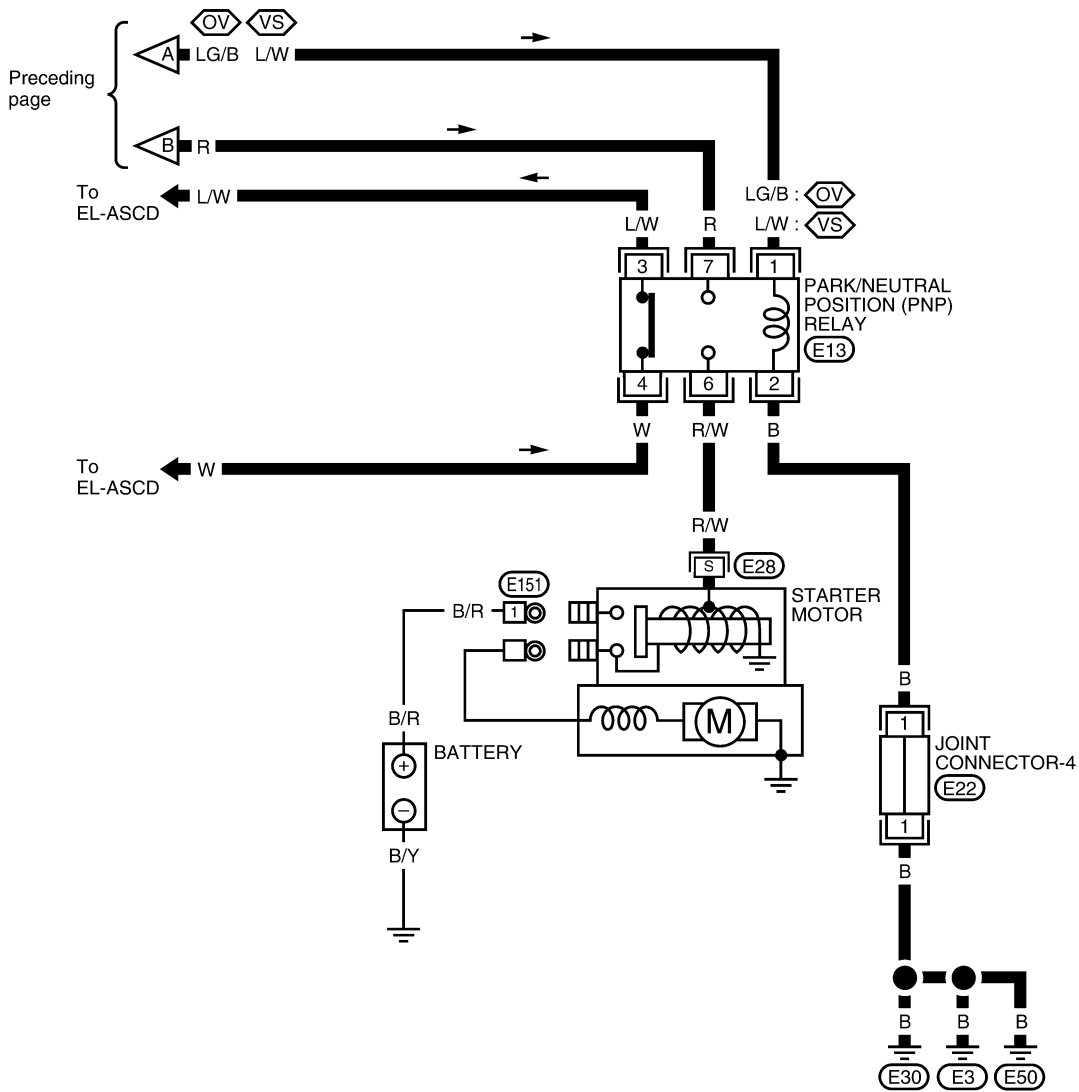
WSC034


STARTING SYSTEM

Wiring Diagram — START — (Cont'd)

SC-START-02

 : With vehicle security system
 : Without vehicle security system



Refer to the following.
 - JOINT CONNECTOR

LSC035

STARTING SYSTEM

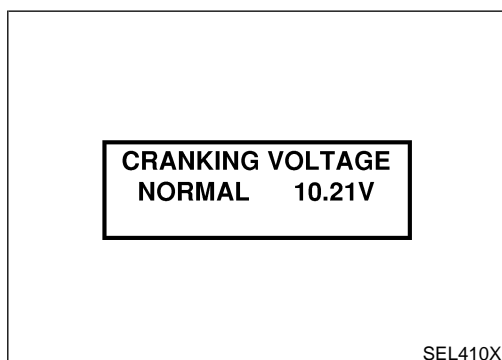
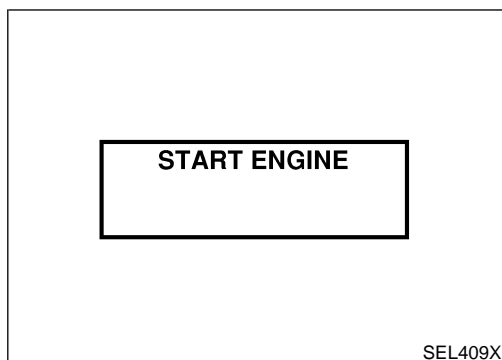
Trouble Diagnoses with Battery/Starting/Charging System Tester

Trouble Diagnoses with Battery/Starting/Charging System Tester

NDS0019

NOTE:

To ensure a complete and thorough diagnosis, the battery, starter and generator test segments must be done as a set from start to finish.



1. Turn off all loads on the vehicle electrical system.
2. Perform battery test with Battery/Starting/Charging system tester. Refer to "Trouble Diagnoses with Battery/Starting/Charging System Tester", SC-13.
3. Press "ENTER" to begin the starting system test.

4. Start the engine.

5. Diagnosis result is displayed on the tester. Refer to "DIAGNOSTIC RESULT ITEM CHART", SC-14.

NOTE:

- If the starter performs normally but the engine does not start, perform engine diagnosis.
- For intermittent "NO CRANK" or "NO STARTER OPERATION" incidents, refer to "DIAGNOSTIC PROCEDURE 2", SC-18.

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STARTING SYSTEM

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

DIAGNOSTIC RESULT ITEM CHART

NDSC0019S01

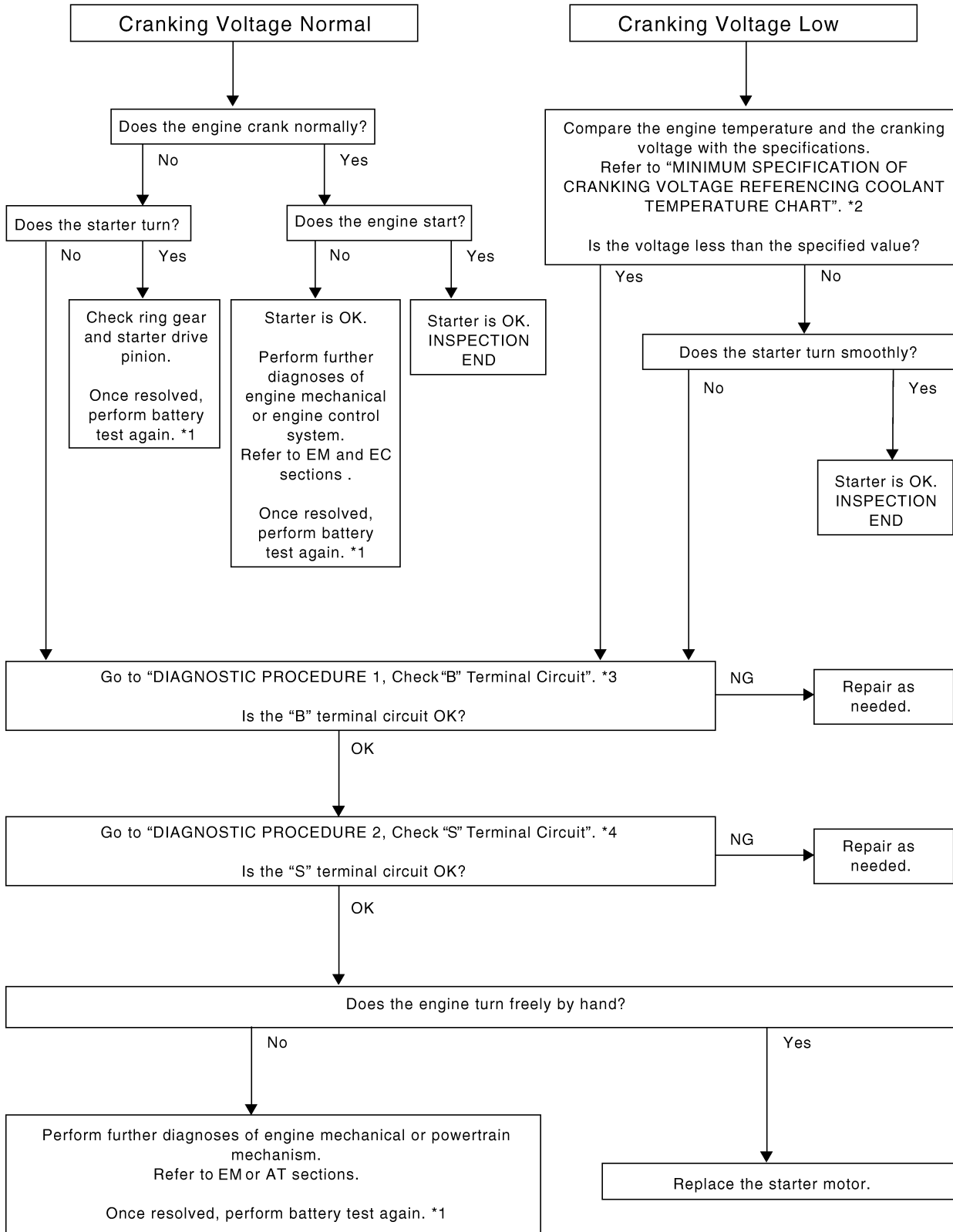
Diagnostic item	Service procedure
CRANKING VOLTAGE NORMAL	Go to "WORK FLOW", SC-15.
CRANKING VOLTAGE LOW	Go to "WORK FLOW", SC-15.
CHARGE BATTERY	Perform the slow battery charging procedure. (Initial rate of charge is 10A for 12 hours.) Perform battery test again with Battery/Starting/Charging system tester. Refer to "Trouble Diagnoses with Battery/Starting/Charging System Tester", SC-13.
REPLACE BATTERY	Before replacing battery, clean the battery cable clamps and battery posts. Perform battery test again with Battery/Starting/Charging system tester. Refer to "Trouble Diagnoses with Battery/Starting/Charging System Tester", SC-13. If second test result is "REPLACE BATTERY", then do so. Perform battery test again to confirm repair.

STARTING SYSTEM

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

WORK FLOW

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*1 SC-13

*2 SC-19

*3 SC-16

*4 SC-18

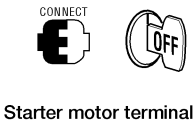
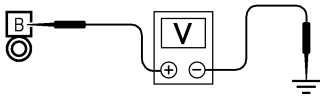
STARTING SYSTEM

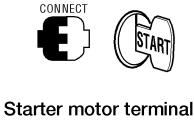
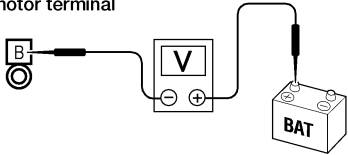
Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

DIAGNOSTIC PROCEDURE 1 Check "B" Terminal Circuit

NDSC0019S03

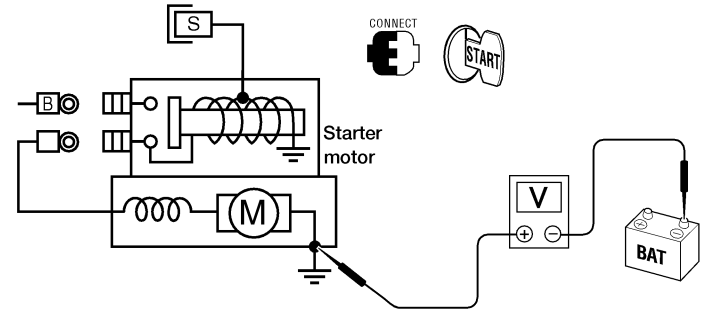
NDSC0019S0301

1	CHECK POWER SUPPLY FOR STARTER MOTOR "B" TERMINAL	
<ol style="list-style-type: none"> 1. Remove the fuel pump fuse. 2. Crank or start the engine (where possible) until the fuel pressure is released. 3. Turn the ignition switch OFF. 4. Check that the starter motor terminal "B" E28 connection is clean and tight. 5. Check voltage between starter motor terminal "B" E151, (B/R) and ground using a digital circuit tester. 		
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Battery voltage should exist.</p> </div> </div> <div style="text-align: center; margin-top: 20px;">  </div> <p style="text-align: right; margin-top: 10px;">LSC037</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>		
OK	▶	GO TO 2.
NG	▶	Check harness between the battery and the starter motor for open circuit.

2	CHECK BATTERY CABLE CONNECTION QUALITY (VOLTAGE DROP TEST)	
<ol style="list-style-type: none"> 1. Check voltage between starter motor terminal "B" E151, (B/R) and battery positive terminal using a digital circuit tester. 		
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>When the ignition switch is in START position, Voltage: Less than 0.5V</p> </div> </div> <div style="text-align: center; margin-top: 20px;">  </div> <p style="text-align: right; margin-top: 10px;">LSC038</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	Check harness between the battery and the starter motor for poor continuity.

STARTING SYSTEM

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

3	CHECK STARTER MOTOR GROUND CIRCUIT (VOLTAGE DROP TEST)	
1. Check voltage between starter motor case and battery negative terminal using a digital circuit tester.		
 <p>When the ignition switch is in START position, Voltage: Less than 0.2V</p> <p>OK or NG</p>		
OK	▶	Starter motor "B" terminal circuit is OK. Further inspection necessary. Refer to "WORK FLOW", SC-15.
NG	▶	Check the starter motor case and ground for poor continuity.

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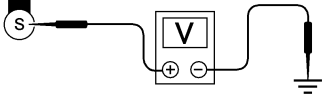
STARTING SYSTEM


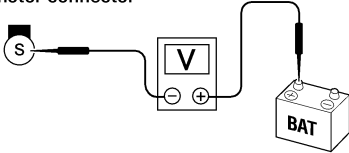
Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

DIAGNOSTIC PROCEDURE 2 Check "S" Terminal Circuit

=NDSC0019S04

NDSC0019S0401

1		CHECK POWER SUPPLY FOR STARTER MOTOR "S" TERMINAL
<ol style="list-style-type: none"> 1. Remove the fuel pump fuse. 2. Crank or start the engine (where possible) until the fuel pressure is released. 3. Turn the ignition switch OFF. 4. Disconnect starter motor terminal "S" E28 connector. 5. Check voltage between starter motor terminal "S" E28, (R/W) and ground using a digital circuit tester. 		
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;">  <p>I.S. DISCONNECT START</p> <p>Starter motor connector</p>  </div> <div style="text-align: right;"> <p>When the ignition switch is in START position, Battery voltage should exist.</p> </div> </div>		
LSC040		
OK or NG		
OK	▶	GO TO 2.
NG	▶	<p>Check the following.</p> <ul style="list-style-type: none"> ● 30A fusible link (letter k, located in fuse and fusible link box) ● Park/neutral position relay ● Harness for open or short

2		CHECK "S" TERMINAL CONNECTION QUALITY (VOLTAGE DROP TEST)
<ol style="list-style-type: none"> 1. Connect starter motor terminal "S" E28 connector. 2. Check voltage between starter motor terminal "S" E28, (R/W) and battery positive terminal using a digital tester. 		
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;">  <p>H.S. CONNECT START</p> <p>Starter motor connector</p>  </div> <div style="text-align: right;"> <p>When the ignition switch is in START position, Voltage: Less than 1V</p> </div> </div>		
LSC041		
OK or NG		
OK	▶	Starter motor "S" terminal circuit is OK. Further inspection necessary. Refer to "WORK FLOW", SC-15.
NG	▶	Check harness between the battery and the starter motor "S" terminal for poor continuity.

STARTING SYSTEM

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

MINIMUM SPECIFICATION OF CRANKING VOLTAGE REFERENCING COOLANT TEMPERATURE

=NDSC0019S05

Engine coolant temperature	Voltage V
-30°C to -20°C (-22°F to -4°F)	7.6
-19°C to -10°C (-2°F to 14°F)	8.5
-9°C to 0°C (16°F to 32°F)	9.7
More than 1°C (More than 34°F)	10.2

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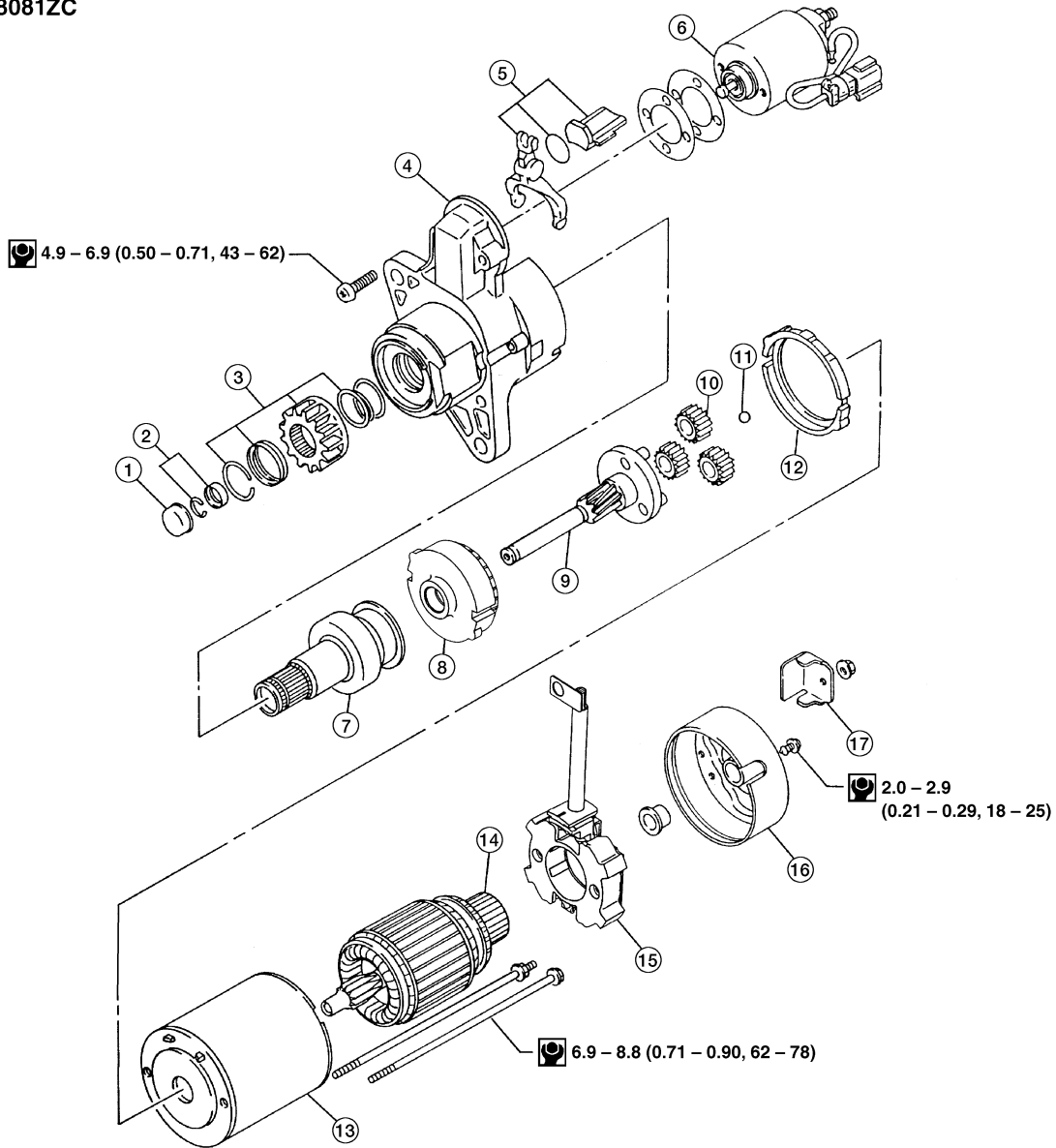
STARTING SYSTEM

Construction

Construction

=NDSC0006

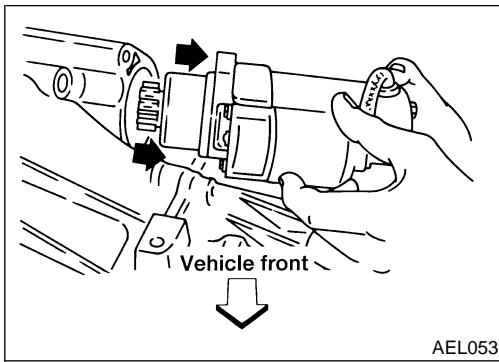
SEC. 233
M001T68081ZC



: N·m (kg-m, in-lb)

ASC004

- | | | |
|-----------------------------|--------------------|--------------------|
| 1. Cap | 7. Clutch gear | 13. Yoke assembly |
| 2. Stopper set | 8. Internal gear | 14. Armature |
| 3. Pinion set | 9. Gear shaft | 15. Brush assembly |
| 4. Front bracket | 10. Planetary gear | 16. Rear bracket |
| 5. Lever set | 11. Ball | 17. Support |
| 6. Magnetic switch assembly | 12. Center bracket | |



Removal and Installation

NDSC0007

1. Disconnect negative battery cable.
2. Remove intake air duct.
3. Remove battery cable from starter motor.
4. Remove brush cable from magnetic switch assembly.
5. Disconnect starter motor harness connector.
6. Remove starter motor mounting bolts.
7. Remove starter motor.

When installing, tighten starter motor mounting bolts.

 : 23 - 26 N·m (2.35 - 2.7 kg·m, 17.0 - 19.2 ft·lb)

Pinion/Clutch Check

NDSC0008

1. Inspect pinion teeth.
 - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
2. Inspect reduction gear teeth.
 - Replace reduction gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)
3. Check to see if pinion locks in one direction and rotates smoothly in the opposite direction.
 - If it locks or rotates in both directions, or unusual resistance is evident, replace.

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CHARGING SYSTEM

System Description

System Description

NDSC0009

The generator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC regulator.

Power is supplied at all times to generator terminal "S" through:

- 10A fuse (No. 35, located in the fuse and fusible link box).

Terminal "B" supplies power to charge the battery and operate the vehicle's electrical system. Output voltage is controlled by the IC regulator at terminal "S" detecting the input voltage. The charging circuit is protected by the 140A fusible link (letter **b**, located in the fuse and fusible link box).

Terminal "E" of the generator supplies ground through body ground A2.

With the ignition switch in the ON or START position, power is supplied:

- through 10A fuse (No. 29, located in the fuse block)
- to combination meter terminal 34 for the charge warning lamp.

Ground is supplied to terminal 31 of the combination meter through terminal "L" of the generator. With power and ground supplied, the charge warning lamp will illuminate. When the generator is providing sufficient voltage with the engine running, the ground is interrupted and the charge warning lamp will go off.

If the charge warning lamp illuminates with the engine running, a fault is indicated.

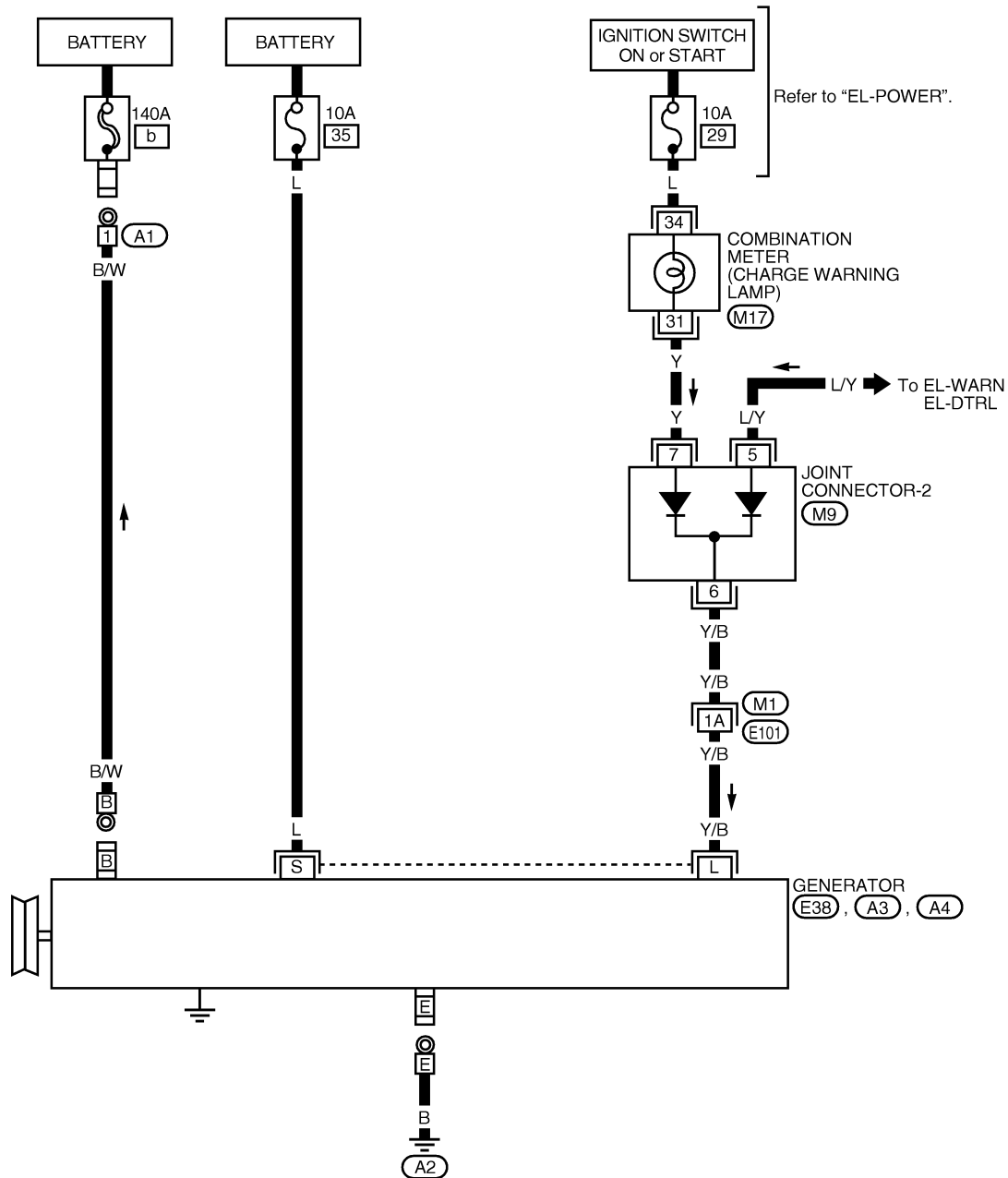
CHARGING SYSTEM

Wiring Diagram — CHARGE —

Wiring Diagram — CHARGE —

NDSC0010

SC-CHARGE-01



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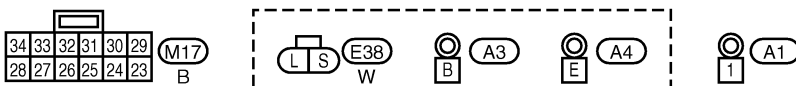
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Refer to the following.
 (M1), (E101) - SUPER MULTIPLE JUNCTION (SMJ)
 (M9) - JOINT CONNECTOR



LSC036

CHARGING SYSTEM

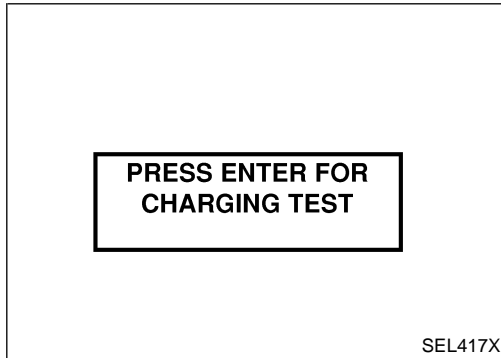
Trouble Diagnoses with Battery/Starting/Charging System Tester

Trouble Diagnoses with Battery/Starting/Charging System Tester

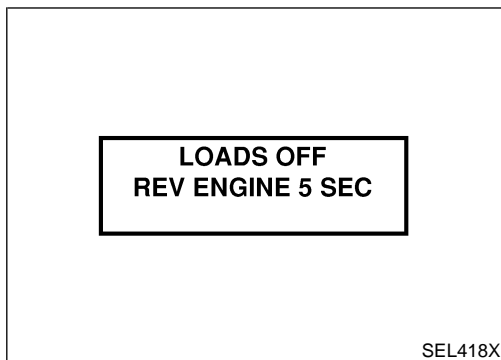
NDS0020

NOTE:

To ensure a complete and thorough diagnosis, the battery, starter and generator test segments must be done as a set from start to finish.



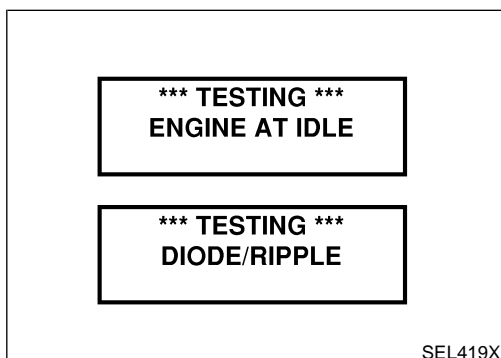
1. Turn off all loads on the vehicle electrical system.
2. Perform battery and starting system test with Battery/Starting/Charging system tester.
3. Press "ENTER" to begin the charging system test.
4. Start engine.



5. Press "ENTER" until "LOADS OFF REV ENGINE 5 SEC" is displayed.
6. Raise and hold the engine speed at 1,500 to 2,000 rpm for about 5 seconds, then return the engine to idle. Once the increase in engine rpm is detected, press "ENTER" to continue.

NOTE:

- If after 30 seconds an increase in engine idle speed is not detected, "RPM NOT DETECTED" will display.
- Some engines may have a higher idle initially after starting, particularly when the engine is cold. The tester may detect this without any other action being taken. If this occurs, continue on with the testing process. The final results will not be affected.



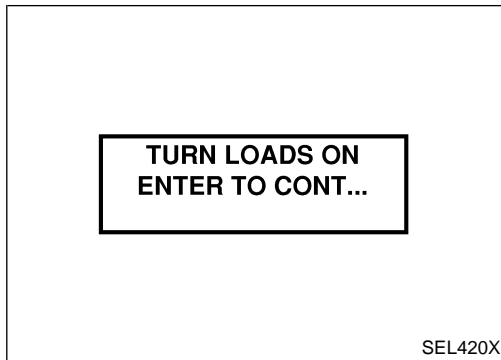
7. The tester now checks the engine at idle and performs the DIODE/RIPPLE check.
8. When complete, the tester will prompt you to turn on the following electrical loads.
 - Heater fan set to highest speed. Do not run the A/C or windshield defroster.
 - Headlamp high beam
 - Rear window defogger

NOTE:

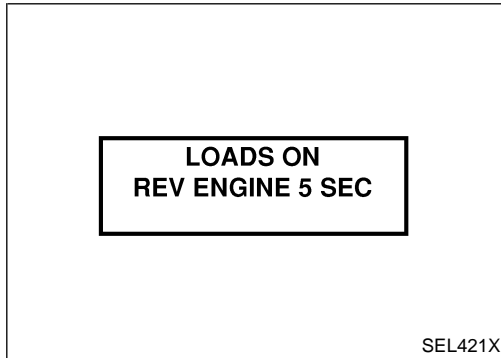
Do not run the windshield wipers or any other cyclical loads.

CHARGING SYSTEM

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)



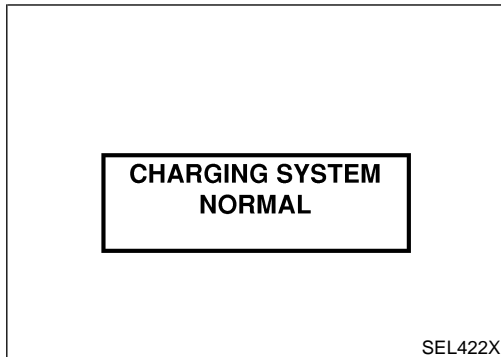
9. Press "ENTER" to continue.



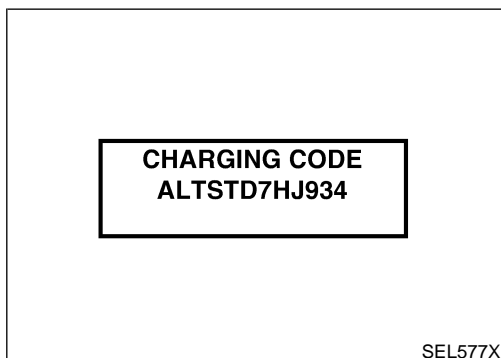
10. Raise and hold the engine speed at 1,500 to 2,000 rpm for about 5 seconds, then return the engine to idle. Once the increase in engine rpm is detected, press "ENTER" to continue.

NOTE:

If after 30 seconds an increase in engine idle speed is not detected, "RPM NOT DETECTED" will be displayed. Press "ENTER" to restart the test.



11. Diagnostic result is displayed on the tester. Refer to "DIAGNOSTIC RESULT ITEM CHART", SC-26.



12. Press "ENTER" then test output code is displayed. Record the test output code on the repair order.

13. Toggle back to the "DIAGNOSTIC SCREEN" for test results.

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CHARGING SYSTEM

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

DIAGNOSTIC RESULT ITEM CHART

NDSC0020S01

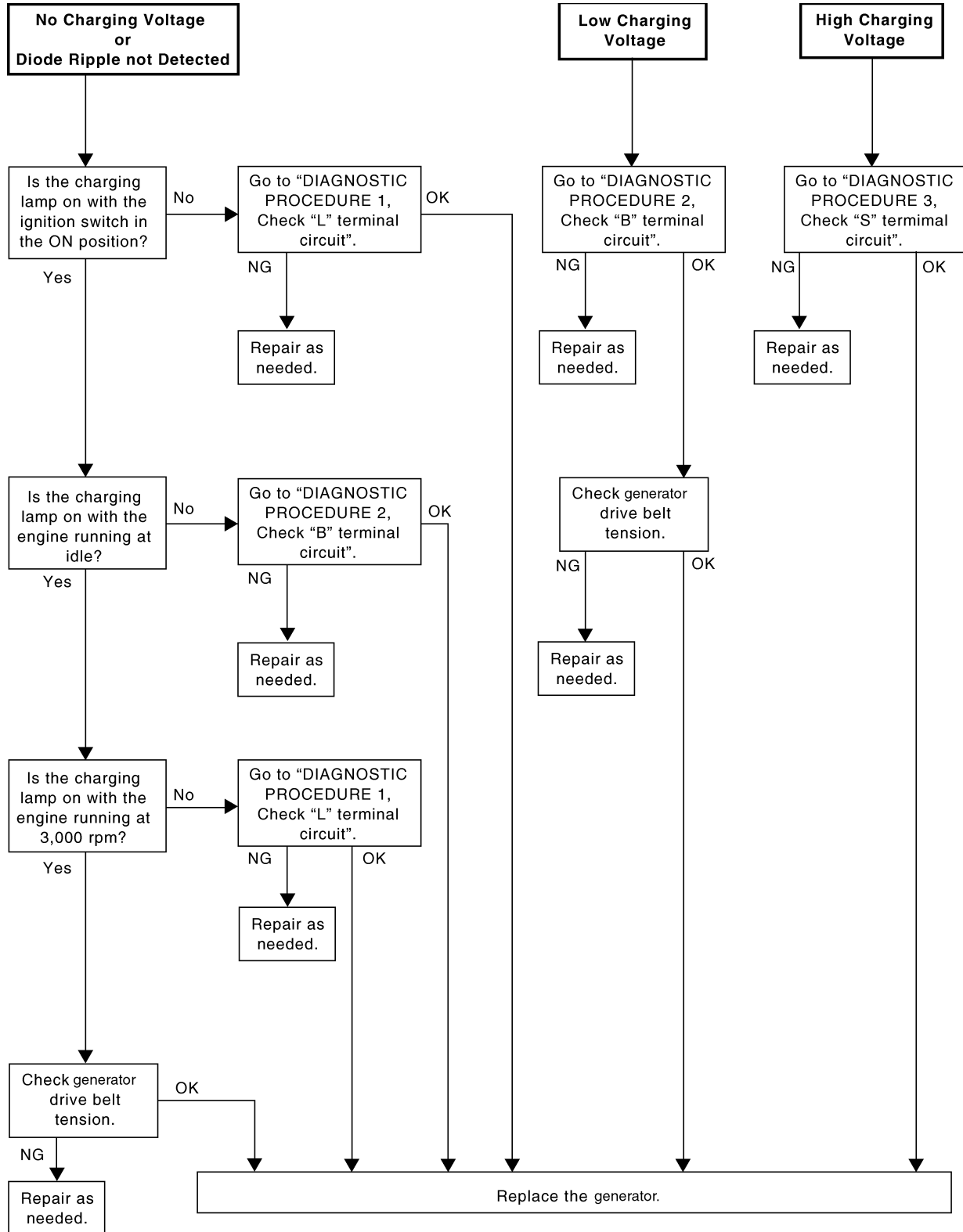
Diagnostic item	Service procedure
CHARGING SYSTEM NORMAL	Charging system is normal and will also show DIODE RIPPLE test result.
NO CHARGING VOLTAGE	Go to "WORK FLOW", SC-27.
LOW CHARGING VOLTAGE	Go to "WORK FLOW", SC-27.
HIGH CHARGING VOLTAGE	Go to "WORK FLOW", SC-27.
DIODE RIPPLE NORMAL	Diode ripple is OK and will also show CHARGING VOLTAGE test result.
EXCESS RIPPLE DETECTED	Replace the generator. Perform "DIODE RIPPLE" test again using Battery/Starting/Charging system tester to confirm repair.
DIODE RIPPLE NOT DETECTED	Go to "WORK FLOW", SC-27.

CHARGING SYSTEM

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

WORK FLOW

NDSC0020S02



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CHARGING SYSTEM




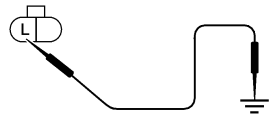
Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

DIAGNOSTIC PROCEDURE 1 Check "L" Terminal Circuit

NDSC0020S03

NDSC0020S0301

1	CHECK "L" TERMINAL CONNECTION	
Check to see if "L" terminal is clean and tight.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair "L" terminal connection. Confirm repair by performing complete Battery/Starting/Charging system test.

2	CHECK "L" TERMINAL CIRCUIT	
<p>1. Disconnect E38 connector from generator. 2. Apply ground to terminal "L" E38, (Y/B) with the ignition switch in the ON position.</p>		
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>T.S.</p> </div> <div style="text-align: center;">  <p>DISCONNECT</p> </div> <div style="text-align: center;">  <p>ON</p> </div> </div> <p style="margin-left: 20px;">Generator connector</p>  <div style="text-align: right; margin-right: 20px;"> <p>CHARGE lamp should light up.</p> </div> <div style="text-align: right; margin-right: 20px;"> <p>LSC042</p> </div>		
OK or NG		
OK	▶	Replace the generator. Confirm repair by performing complete Battery/Starting/Charging system test.
NG	▶	<p>Check the following.</p> <ul style="list-style-type: none"> ● 10A fuse (No. 29, located in fuse block) ● CHARGE lamp ● Harness for open or short between combination meter and fuse ● Harness for open or short between combination meter and generator

CHARGING SYSTEM

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)


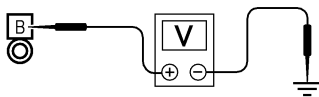
DIAGNOSTIC PROCEDURE 2


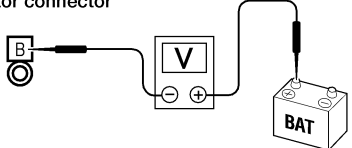
Check "B" Terminal Circuit

=NDSC0020S04

NDSC0020S0401

1	CHECK "B" TERMINAL CONNECTION	
Check to see if "B" terminal is clean and tight.		
OK or NG		
OK	▶	GO TO 2. Confirm repair by performing complete Battery/Starting/Charging system test.
NG	▶	Repair "B" terminal connection.

2	CHECK GENERATOR "B" TERMINAL CIRCUIT	
Check voltage between generator terminal "B" and ground using a digital circuit tester.		
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  Generator connector </div> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Battery voltage should exist.</p> </div> </div>		
LSC043		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Check the following. <ul style="list-style-type: none"> ● 140A fusible link (letter b, located in fuse and fusible link box) ● Harness for open or short between generator and fusible link

3	CHECK "B" TERMINAL CONNECTION QUALITY (VOLTAGE DROP TEST)	
Check voltage between generator terminal "B" and battery positive terminal using a digital tester.		
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  Generator connector </div> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>With the engine running at idle and warm, Voltage: Less than 0.2V</p> </div> </div>		
LSC044		
OK or NG		
OK	▶	Replace the generator. Confirm repair by performing complete Battery/Starting/Charging system test.
NG	▶	Check harness between the battery and the generator for poor continuity.

CHARGING SYSTEM

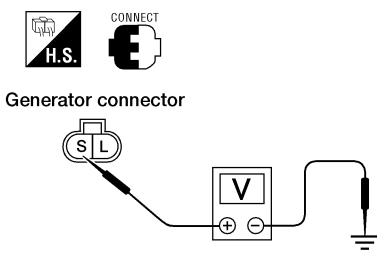
Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

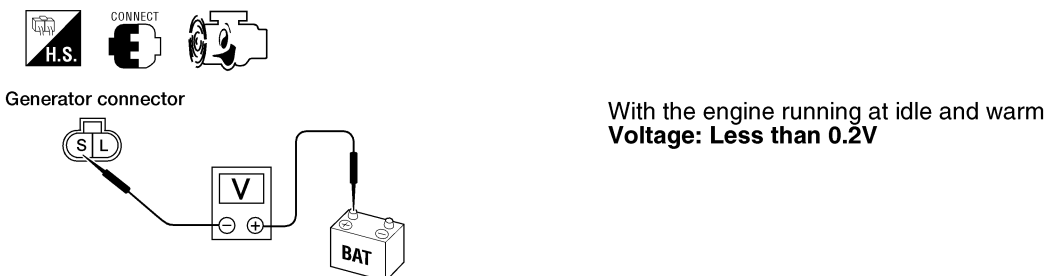
DIAGNOSTIC PROCEDURE 3 Check "S" Terminal Circuit

=NDSC0020S05

NDSC0020S0501

1	CHECK "S" TERMINAL CONNECTION
Check to see if "S" terminal is clean and tight.	
OK or NG	
OK	▶ GO TO 2.
NG	▶ Repair "S" terminal connection. Confirm repair by performing complete Battery/Starting/Charging system test.

2	CHECK GENERATOR "S" TERMINAL CIRCUIT
Check voltage between generator terminal "S" E38, (L) and ground using a digital circuit tester.	
 <p style="text-align: right;">Battery voltage should exist.</p> <p style="text-align: right;">LSC045</p>	
OK or NG	
OK	▶ GO TO 3.
NG	▶ Check the following. <ul style="list-style-type: none"> ● 10A fuse (No. 35, located in fuse and fusible link box) ● Harness for open or short between generator and fuse

3	CHECK "S" TERMINAL CONNECTION QUALITY (VOLTAGE DROP TEST)
Check voltage between generator terminal "S" E38, (L) and battery positive terminal using a digital tester.	
 <p style="text-align: right;">With the engine running at idle and warm, Voltage: Less than 0.2V</p> <p style="text-align: right;">LSC046</p>	
OK or NG	
OK	▶ Replace the generator. Confirm repair by performing complete Battery/Starting/Charging system test.
NG	▶ Check harness between the battery and the generator for poor continuity.

CHARGING SYSTEM

Trouble Diagnoses with Battery/Starting/Charging System Tester (Cont'd)

MALFUNCTION INDICATOR

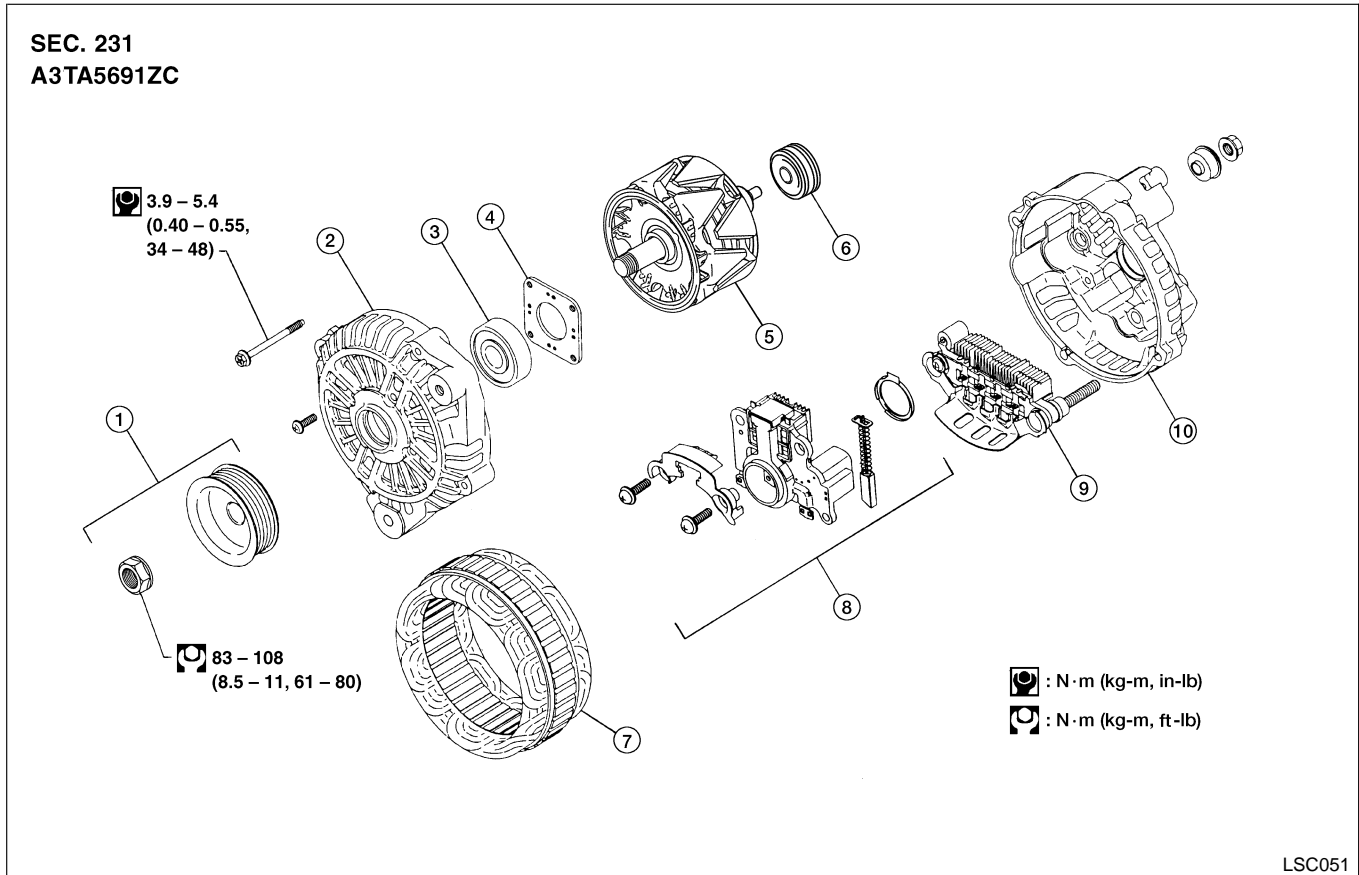
-NDS0020S06

The IC regulator warning function activates to illuminate "CHARGE" warning lamp, if any of the following symptoms occur while generator is operating:

- Excessive voltage is produced.
- No voltage is produced.

Construction

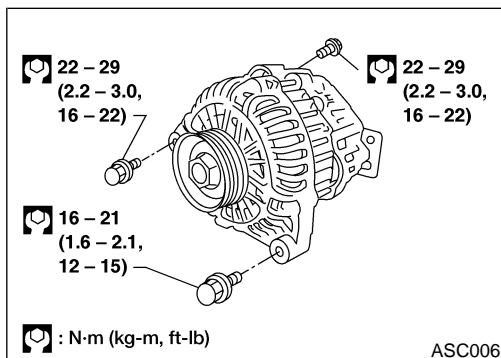
NDS0012



1. Pulley assembly
2. Front cover
3. Front bearing
4. Bearing retainer

5. Rotor
6. Rear bearing
7. Stator

8. IC voltage regulator assembly
9. Diode assembly
10. Rear cover



Removal and Installation

NDS0013

1. Disconnect negative battery cable.
 2. Loosen idler pulley adjusting bolt.
 3. Remove A/C compressor belt.
 4. Remove engine undercover.
 5. Remove generator harness and bracket.
 6. Loosen generator mounting bolts.
 7. Remove drive belt.
 8. Remove generator.
- Install in the reverse order of removal.

SERVICE DATA AND SPECIFICATIONS (SDS)

Battery

Battery

NDSC0014

Applied area	USA		Canada
	Standard	Option	Standard
Type	35	24R	
Capacity V-AH	12-60	12-75	
Cold cranking current A (For reference value)	450	525	

Starter

NDSC0015

Type		M001T68081ZC
		MITSUBISHI make
		Reduction gear type
System voltage		12V
No-load	Terminal voltage	11.0V
	Current	Less than 90A
	Revolution	More than 2,400 rpm
Minimum diameter of commutator		28.8 mm (1.134 in)
Minimum length of brush		7.0 mm (0.276 in)
Brush spring tension		11.8 - 23.5 N (1.2 - 2.4 kg, 2.7 - 5.3 lb)
Clearance between pinion front edge and pinion stopper mm (in)		0.5 - 2.0 mm (0.0197 - 0.0787)

Generator

NDSC0016

Type		A3TA5691ZC
		MITSUBISHI make
Nominal rating		12V-125A
Ground polarity		Negative
Minimum revolution under no-load (When 13.5 volts is applied)		1,300 rpm
Hot output current (When 13.5 volts is applied)		More than 36A/1,300 rpm More than 90A/2,500 rpm
Regulated output voltage		14.1 - 14.7V
Minimum length of brush		6.0 mm (0.236 in)
Brush spring pressure		5.00 - 5.78 N (510 - 590 g, 17.99 - 20.81 oz)
Slip ring minimum outer diameter		22.5 mm (0.886 in)