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SECTION SC

STARTING & CHARGING SYSTEM

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PRECAUTIONS

PRECAUTIONS

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Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

NKS0016G

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB 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 must be performed by an authorized NISSAN/INFINITI 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 SRS 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 and/or orange harnesses or harness connectors.

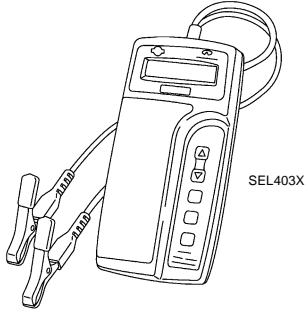
PREPARATION

PREPARATION

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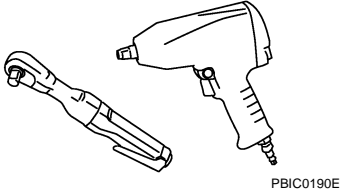
Special Service Tools

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Tool number Tool name	Description
J-44373 Model 620 Battery/Starting/Charging system tester	

Commercial Service Tools

NKS0016J

Tool number Tool name	Description
Power tool	

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BATTERY

BATTERY

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How to Handle Battery

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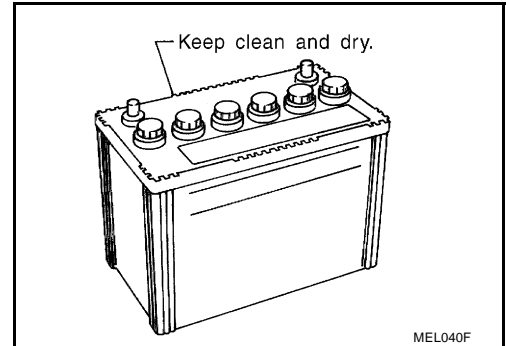
CAUTION:

- 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.

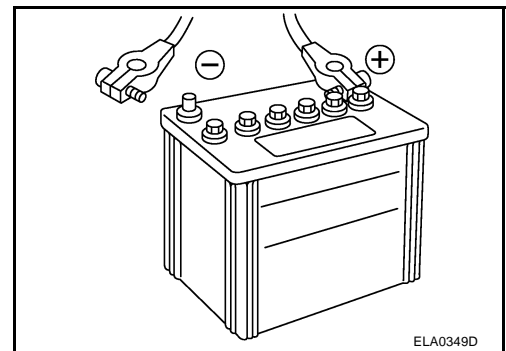
METHODS OF PREVENTING OVER-DISCHARGE

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

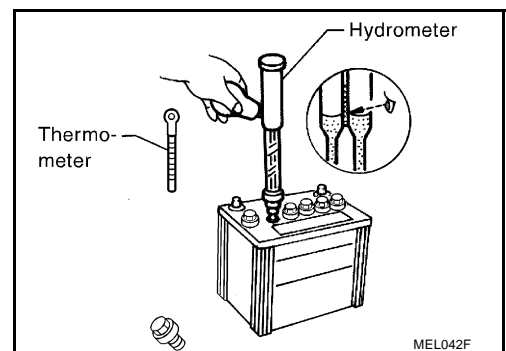
- The battery surface (particularly its top) should always be kept clean and dry.
- The terminal connections should be clean and tight.
- At every routine maintenance, check the electrolyte level. This also applies to batteries designated as "low maintenance" and "maintenance-free".



- When the vehicle is not going to be used over a long period of time, disconnect the battery cable from the negative 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.



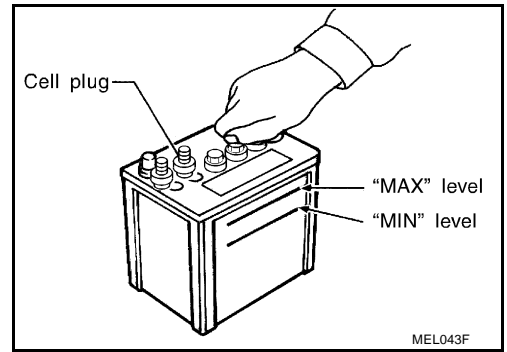
CHECKING ELECTROLYTE LEVEL

WARNING:

Never allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, never 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

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

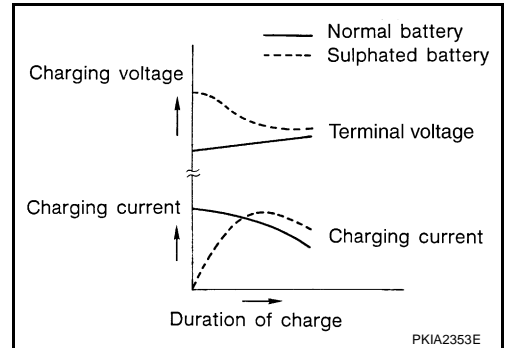


Sulphation

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.

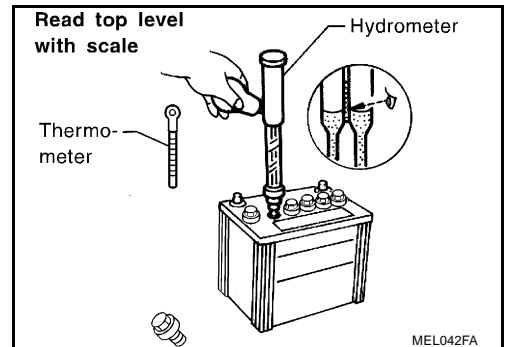
To determine if a battery has been “sulphated”, note its voltage and current when charging it. As shown in the figure, less current and higher voltage are observed in the initial stage of charging sulphated batteries.

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

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

Battery electrolyte temperature °C (°F)	Add to specific gravity reading
71 (160)	0.032
66 (150)	0.028
60 (140)	0.024
54 (130)	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
4 (40)	-0.016
-1 (30)	-0.020
-7 (20)	-0.024

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BATTERY

Battery electrolyte temperature °C (°F)	Add to specific gravity reading
-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

CAUTION:

- Never “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. Never turn on the charger first, as this may cause a spark.
- If battery electrolyte temperature rises above 55 °C (131 °F), stop charging. Always charge battery at a temperature below 55 °C (131 °F).

Charging Rates

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 0.050, the battery should be replaced.

Trouble Diagnosis with Battery/Starting/Charging System Tester

NKS0016L

CAUTION:

When working with batteries, always wear appropriate eye protection.

NOTE:

- To ensure a complete and thorough diagnosis, the battery, starter and alternator 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 headlamps 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.

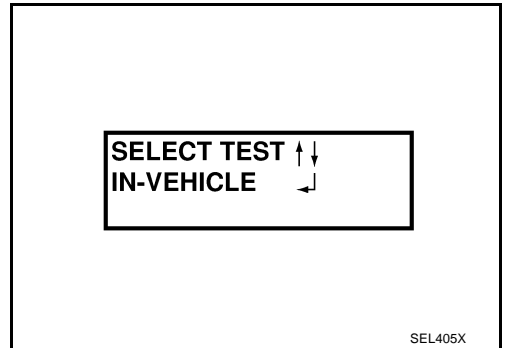
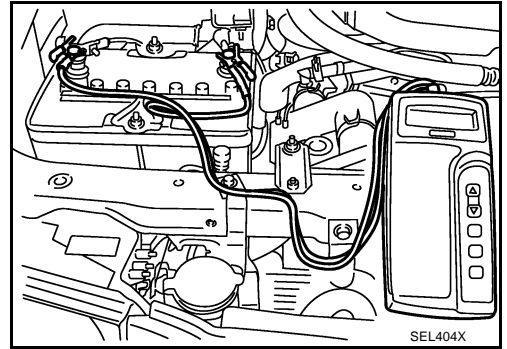
BATTERY

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.



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.

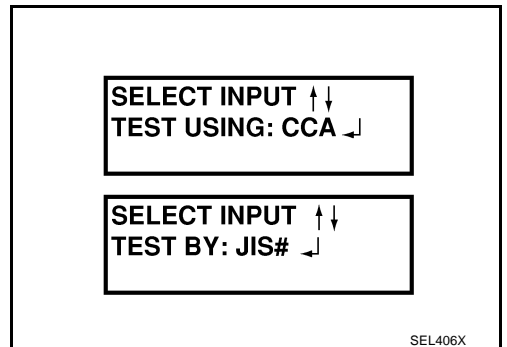
The tester requires the rating for the battery be entered exactly as it is written or stamped on the battery. Do not attempt a CCA conversion for JIS stamped batteries. JIS must be input directly.

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 [SC-8, "DIAGNOSTIC RESULT ITEM CHART"](#).



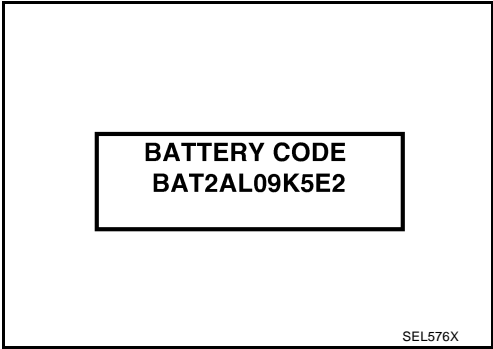
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BATTERY

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 CHANGE".
- 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".



DIAGNOSTIC RESULT ITEM CHART

Diagnostic item	Service procedure
GOOD BATTERY	Battery is OK, go to "Trouble Diagnosis", "STARTING SYSTEM". Refer to SC-11, "Trouble Diagnosis with Battery/Starting/Charging System Tester" .
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.
BAD CELL-REPLACE	Replace the battery. Perform battery test again with Battery/Starting/Charging system tester to confirm repair.
GOOD-RECHARGE	Perform the slow battery charging procedure. (Initial rate of charge is 10 A for 12 hours.) Perform battery test again with Battery/Starting/Charging system tester.
CHARGE & RETEST	Perform the slow battery charging. (Initial rate of charge is 10 A 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".

Removal and Installation

Observe the following to ensure proper servicing.

CAUTION:

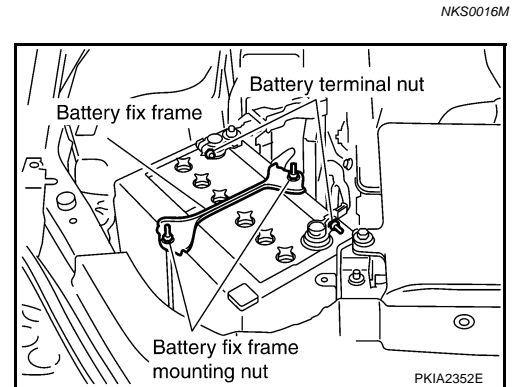
- When disconnecting, disconnect the battery cable from the negative terminal first. But when connecting, connect the battery cable to the positive terminal first.
- Tighten parts to the specified torque shown below.

Battery fix frame mounting nut:

: 4.4 N·m (0.45 kg·m, 39 in·lb)

Battery terminal nut:

: 4.0 N·m (0.41 kg·m, 35 in·lb)



STARTING SYSTEM

STARTING SYSTEM

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System Description

NKS0016N

Power is supplied at all times

- through 50A fusible link (letter **G** , located in the fuse, fusible link and relay block)
- to ignition switch terminal 1.

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

- from ignition switch terminal 4
- to park/neutral position relay terminal 7.

Ground is supplied with the selector lever in the P or N position

- to A/T assembly terminal 9
- through park/neutral position relay terminals 1 and 2
- from grounds E24, E42 and E62.

Then park/neutral position switch is energized and power is supplied

- from park/neutral position relay terminal 6
- to starter motor harness connector terminal 1.

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

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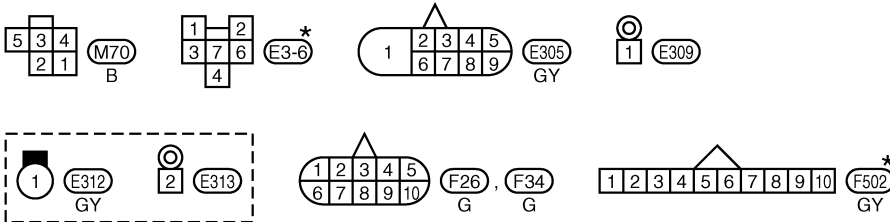
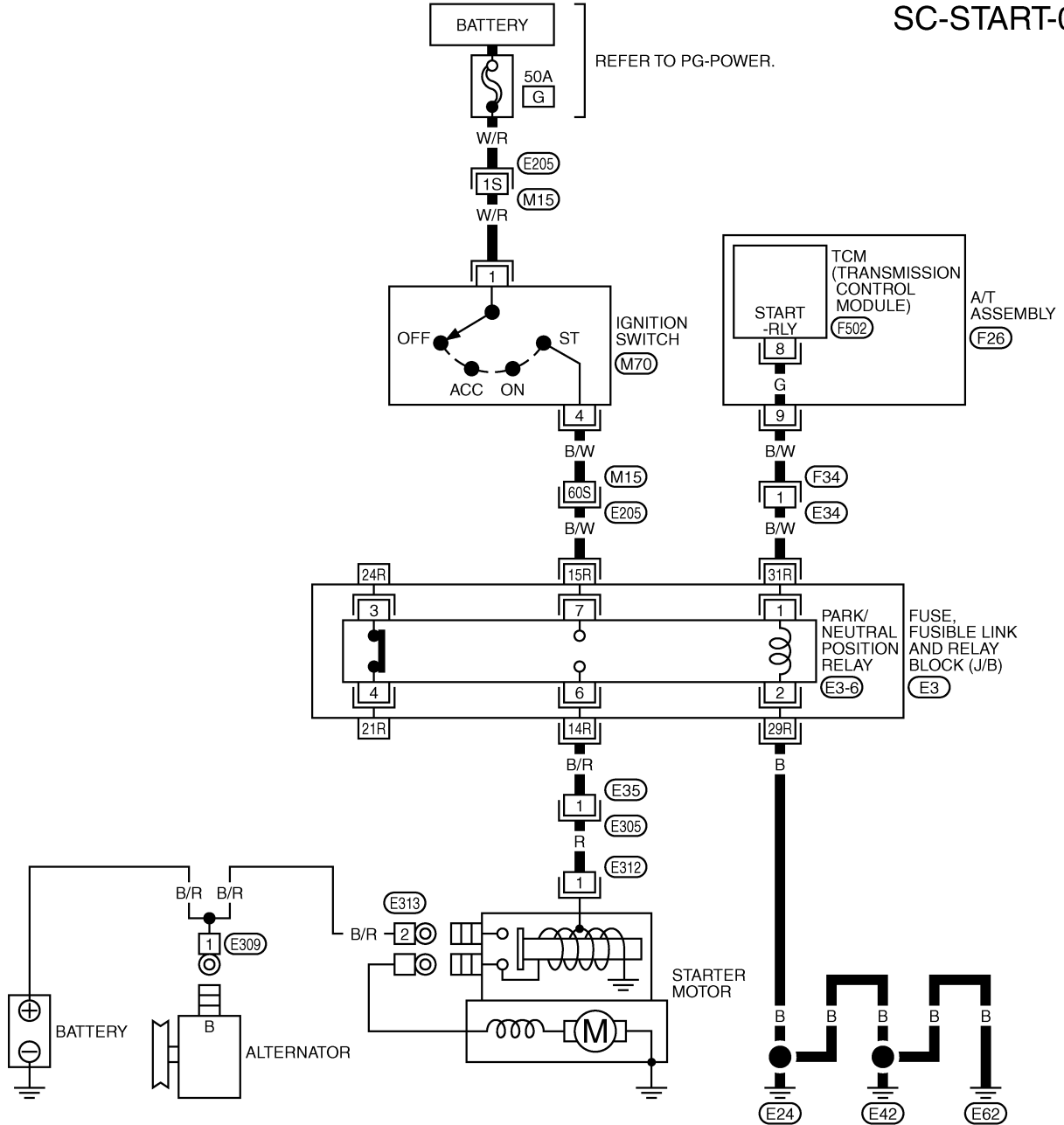
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STARTING SYSTEM

Wiring Diagram — START —

NKS00160

SC-START-01



REFER TO THE FOLLOWING.

- (E205) -SUPER MULTIPLE JUNCTION (SMJ)
- (E3) -FUSE, FUSIBLE LINK AND RELAY BLOCK (J/B)

*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

TKWM1455E

STARTING SYSTEM

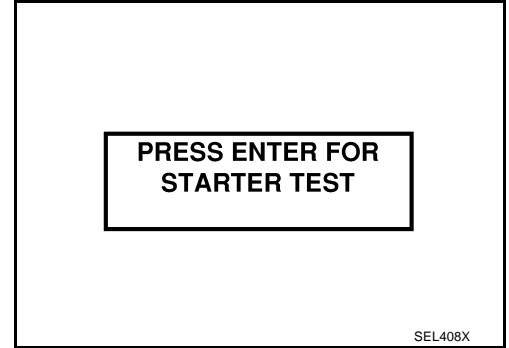
Trouble Diagnosis with Battery/Starting/Charging System Tester

NKS0016P

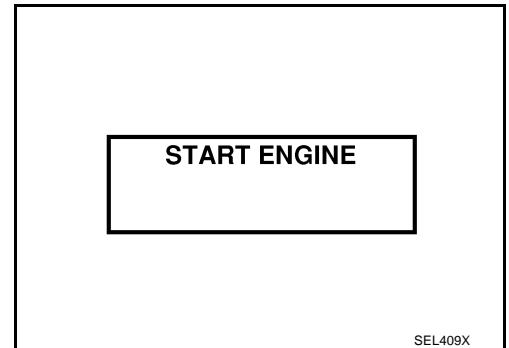
NOTE:

To ensure a complete and thorough diagnosis, the battery, starter and alternator 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 [SC-6, "Trouble Diagnosis with Battery/Starting/Charging System Tester"](#) .
3. Press "ENTER" to begin the starting system test.



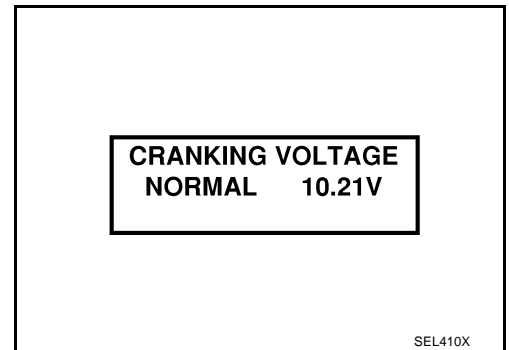
4. Start the engine.



5. Diagnostic result is displayed on the tester. Refer to [SC-11, "DIAGNOSTIC RESULT ITEM CHART"](#) .

NOTE:

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

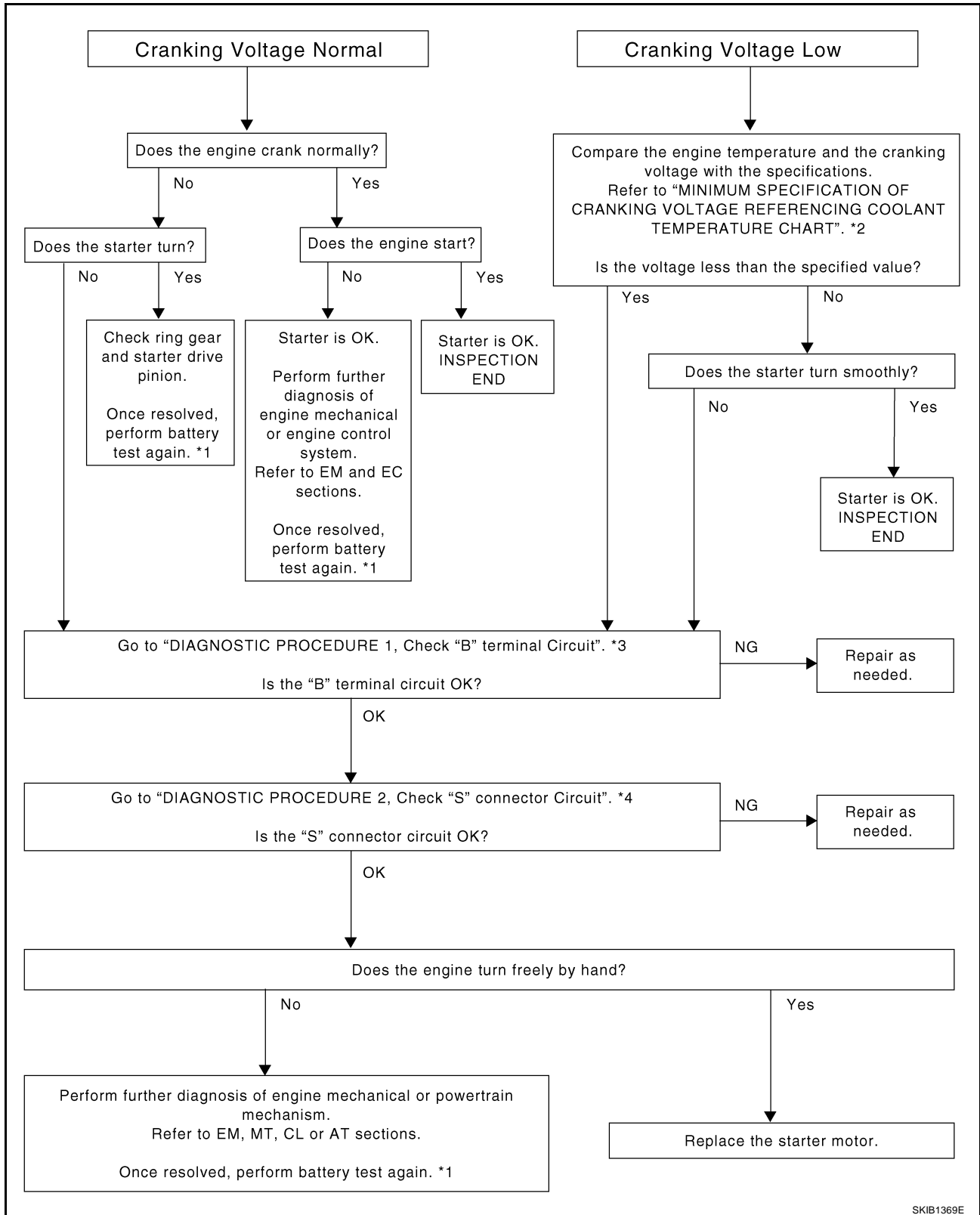


DIAGNOSTIC RESULT ITEM CHART

Diagnostic item	Service procedure
CRANKING VOLTAGE NORMAL	Go to SC-12, "WORK FLOW" .
CRANKING VOLTAGE LOW	
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 SC-6, "Trouble Diagnosis with Battery/Starting/Charging System Tester" .
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 SC-6, "Trouble Diagnosis with Battery/Starting/Charging System Tester" . If second test result is "REPLACE BATTERY", then do so. Perform battery test again to confirm repair.

STARTING SYSTEM

WORK FLOW



SKIB1369E

*1 [SC-6, "Trouble Diagnosis with Battery/Starting/Charging System Tester"](#)

*2 [SC-14, "MINIMUM SPECIFICATION OF CRANKING VOLTAGE REFERENCING COOLANT TEMPERATURE"](#)

*3 [SC-13, "Check "B" Terminal Circuit"](#)

*4 [SC-14, "Check "S" Connector Circuit"](#)

STARTING SYSTEM

DIAGNOSTIC PROCEDURE 1

Check "B" Terminal Circuit

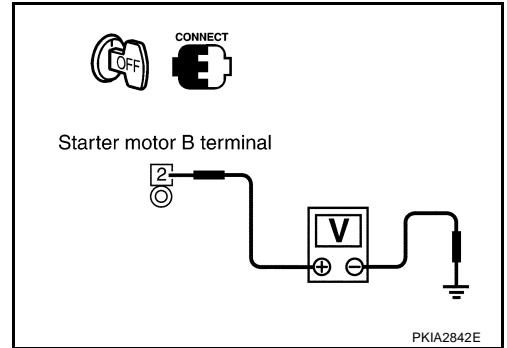
1. CHECK "B" TERMINAL CIRCUIT

1. Remove fuel pump fuse.
2. Crank or start the engine (where possible) until the fuel pressure is released.
3. Turn ignition switch OFF.
4. Make sure that starter motor "B" terminal E313 terminal 2 (B/R) connection is clean and tight.
5. Check voltage between starter motor "B" terminal E313 terminal 2 (B/R) and ground.

2 (B/R) – Ground : Battery voltage

OK or NG

- OK >> GO TO 2.
NG >> Check harness between battery and starter motor for open circuit.



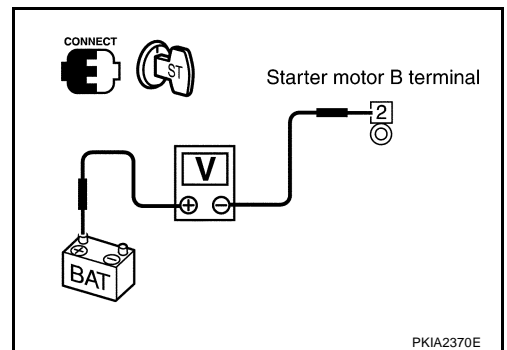
2. CHECK BATTERY CABLE CONNECTION STATUS (VOLTAGE DROP TEST)

Check voltage between starter motor B terminal E313 terminal 2 (B/R) and battery positive terminal.

2 (B/R) – Battery positive terminal
When the ignition switch is in START position : Less than 0.5 V

OK or NG

- OK >> GO TO 3.
NG >> Check harness between the battery and the starter motor for poor continuity.



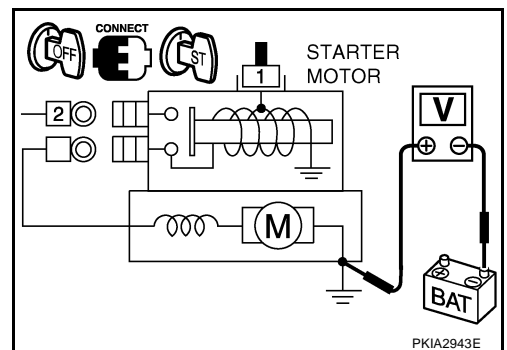
3. CHECK GROUND CIRCUIT STATUS (VOLTAGE DROP TEST)

1. Turn ignition switch OFF.
2. Check voltage between starter motor case and battery negative terminal.

Starter motor case – Battery negative terminal
When the ignition switch is in START position : Less than 0.2 V

OK or NG

- OK >> "B" terminal circuit is OK. Further inspection necessary. Refer to [SC-12, "WORK FLOW"](#) .
NG >> Check the starter motor case and ground for poor continuity.



STARTING SYSTEM

DIAGNOSTIC PROCEDURE 2

Check "S" Connector Circuit

1. CHECK "S" CONNECTOR CIRCUIT

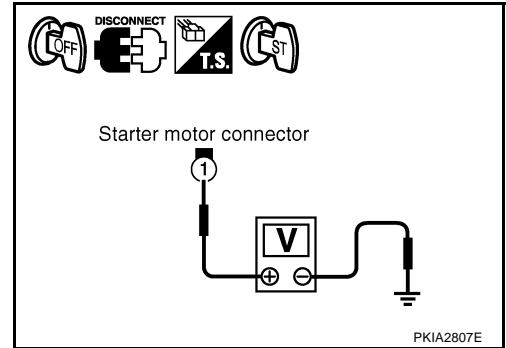
1. Remove fuel pump fuse.
2. Crank or start the engine (where possible) until the fuel pressure is released.
3. Turn ignition switch OFF.
4. Disconnect starter motor connector.
5. Check voltage between starter motor harness connector E312 terminal 1 (R) and ground.

1 (R) – Ground

When the ignition switch is in : Battery voltage
START position

OK or NG

- OK >> "S" connector circuit is OK. Further inspection necessary. Refer to [SC-12, "WORK FLOW"](#).
- NG >> Check the following.
- 50 A fusible link (letter **G**, located in fuse, fusible link and relay block)
 - Ignition switch
 - Park/neutral position relay
 - Harness for open or short



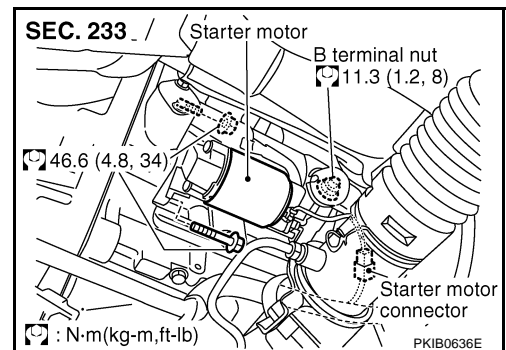
MINIMUM SPECIFICATION OF CRANKING VOLTAGE REFERENCING COOLANT TEMPERATURE

Engine coolant temperature	Voltage [V]
-30 °C to -20 °C (-22 °F to -4 °F)	8.6
-19 °C to -10 °C (-2 °F to 14 °F)	9.1
-9 °C to 0 °C (16 °F to 32 °F)	9.5
More than 1 °C (More than 34 °F)	9.9

Removal and Installation

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove engine undercover.
3. Disconnect starter motor connector.
4. Remove "B" terminal nut.
5. Remove engine mounting insulator (right side). Refer to [EM-79, "ENGINE ASSEMBLY"](#).
6. Remove starter motor mounting bolt and nut.
7. Remove starter motor to the direction of under side the vehicle.



INSTALLATION

Installation is the reverse order of removal.

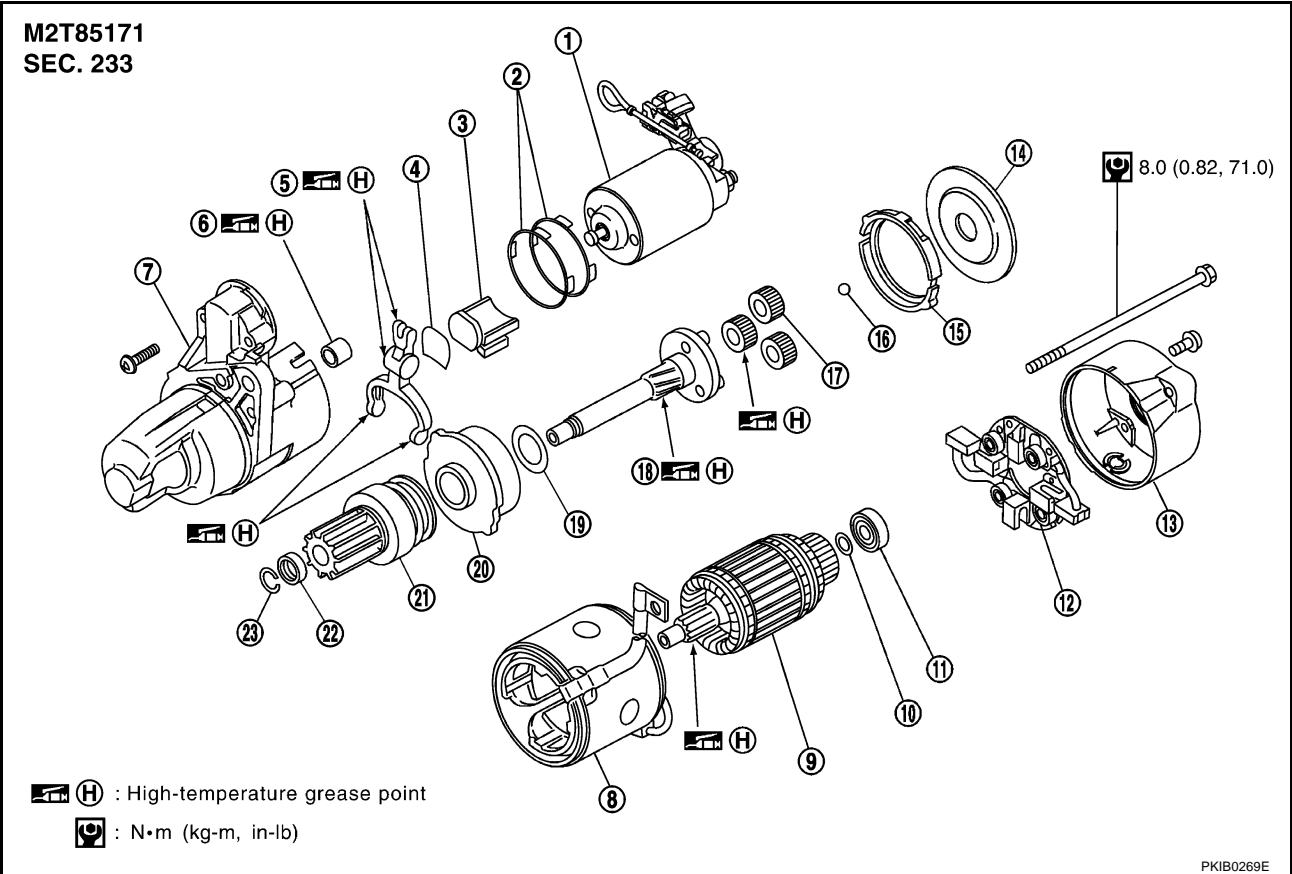
CAUTION:

Be sure to tighten B terminal nut carefully.

STARTING SYSTEM

Disassembly and Assembly

NKS0016R



PKIB0269E

- | | | |
|-----------------------------|--------------------|---------------------------|
| 1. Magnetic switch assembly | 2. Adjusting plate | 3. Packing |
| 4. Plate | 5. Shift lever | 6. Sleeve bearing |
| 7. Gear case | 8. Yoke | 9. Armature |
| 10. Washer | 11. Rear bearing | 12. Brush holder assembly |
| 13. Rear cover | 14. Cover | 15. Packing |
| 16. Ball | 17. Planetary gear | 18. Pinion shaft |
| 19. Thrust washer | 20. Internal gear | 21. Pinion assembly |
| 22. Pinion stopper | 23. Stopper clip | |

Inspection After Disassembly PINION/CLUTCH CHECK

NKS0016S

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 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.

CHARGING SYSTEM

CHARGING SYSTEM

PFP:00011

System Description DESCRIPTION

NKS0016T

The alternator 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

- through 15A fuse [No. 56, located in the fuse, fusible link and relay block (J/B)]
- to alternator terminal 4 ("S" terminal).

"B" terminal supplies power to charge the battery and operate the vehicle's electrical system. Output voltage is controlled by the IC regulator at terminal 4 ("S" terminal) detecting the input voltage.

The alternator is grounded to the engine block.

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

- through 10A fuse [No. 9, located in the fuse block (J/B) No.1]
- to combination meter terminal 59 for the charge warning lamp.

Ground is supplied

- to combination meter terminal 13
- through alternator terminal 3 ("L" terminal)
- to alternator terminal 2 ("E" terminal)
- through ground E307.

The charge warning lamp will illuminate. When the alternator is providing sufficient voltage with the engine running, the ground is opened and the charge warning lamp will go off.

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

MALFUNCTION INDICATOR

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

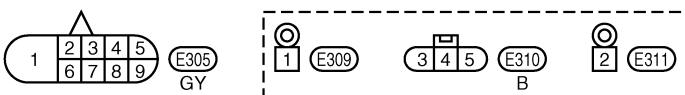
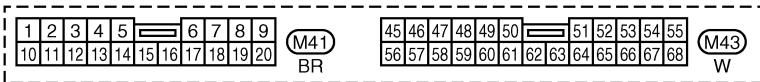
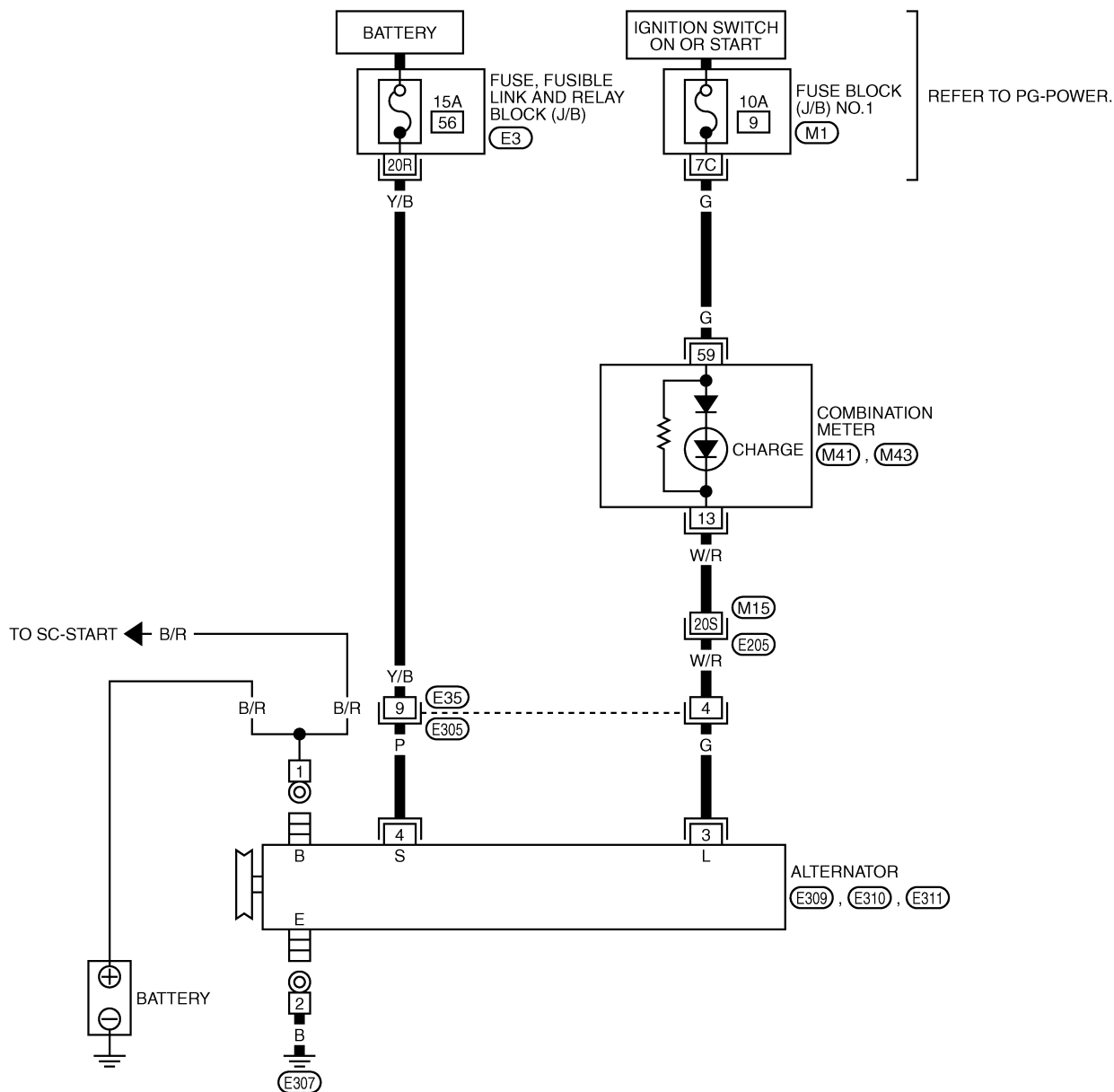
- Excessive voltage is produced.
- No voltage is produced.

CHARGING SYSTEM

Wiring Diagram — CHARGE —

NKS0016U

SC-CHARGE-01



REFER TO THE FOLLOWING.

(E205) -SUPER MULTIPLE JUNCTION (SMJ)

(M1) -FUSE BLOCK-JUNCTION BOX (J/B) NO.1

(E3) -FUSE, FUSIBLE LINK AND RELAY BLOCK (J/B)

TKWM1454E

CHARGING SYSTEM

Trouble Diagnoses with Battery/Starting/Charging System Tester

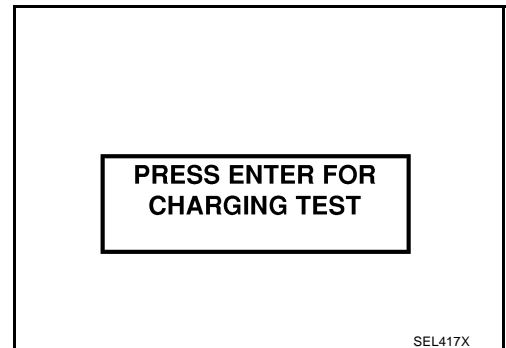
NKS0016V

NOTE:

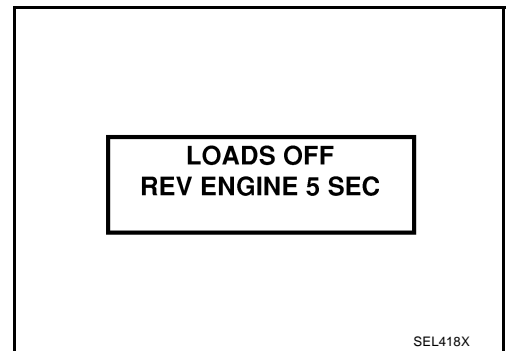
To ensure a complete and thorough diagnosis, the battery, starter and alternator test segments must be done as a set from start to finish.

Before starting, perform the preliminary inspection. Refer to [SC-21, "PRELIMINARY INSPECTION"](#) .

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.



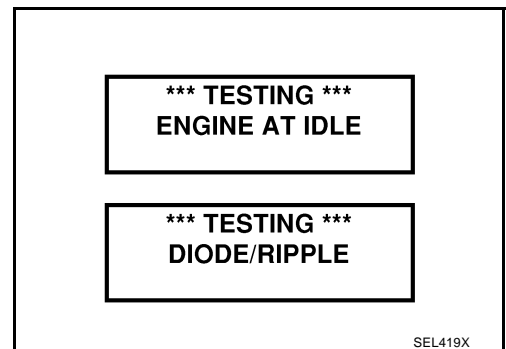
5. Press "ENTER" until "LOADS OFF REV ENGINE 5 SEC" is displayed.
6. Raise and hold the engine speed at 1,500 to 2,000 rpm for about 5 seconds, then return the engine to idle. Once the increase in engine rpm is detected, press "ENTER" to continue.



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.

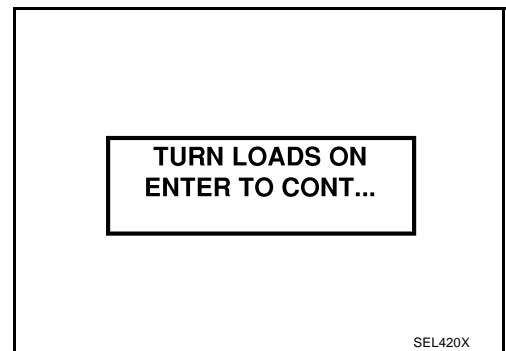
7. The tester now checks the engine at idle and performs the DIODE/RIPPLE check.
8. When complete, the tester will prompt you to turn on the following electrical loads.
 - Heater fan set to highest speed. Do not run the A/C or windshield defroster.
 - Headlamp high beam
 - Rear window defogger



NOTE:

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

9. Press "ENTER" to continue.

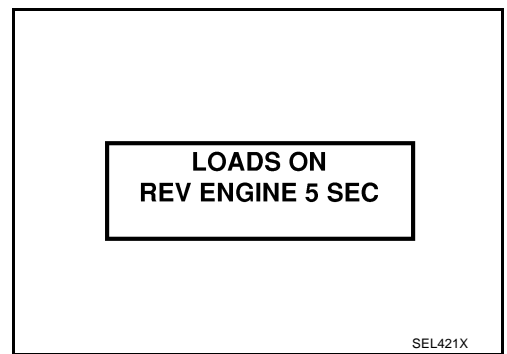


CHARGING SYSTEM

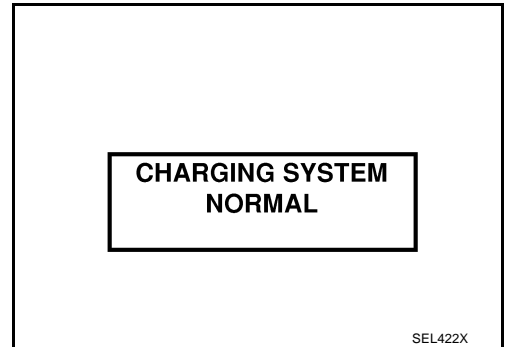
10. Raise and hold the engine speed at 1,500 to 2,000 rpm for about 5 seconds, then return the engine to idle. Once the increase in engine rpm is detected, press "ENTER" to continue.

NOTE:

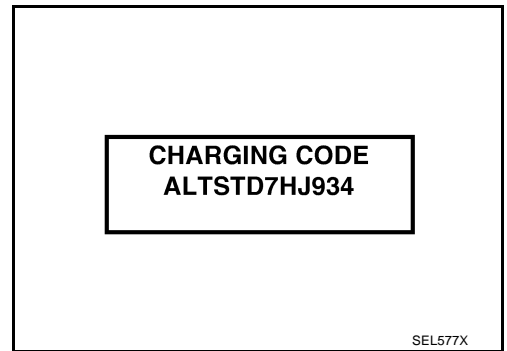
If after 30 seconds an increase in engine idle speed is not detected, "RPM NOT DETECTED" will be displayed. Press "ENTER" to restart the test.



11. Diagnostic result is displayed on the tester. Refer to [SC-19](#), "[DIAGNOSTIC RESULT ITEM CHART](#)".



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.

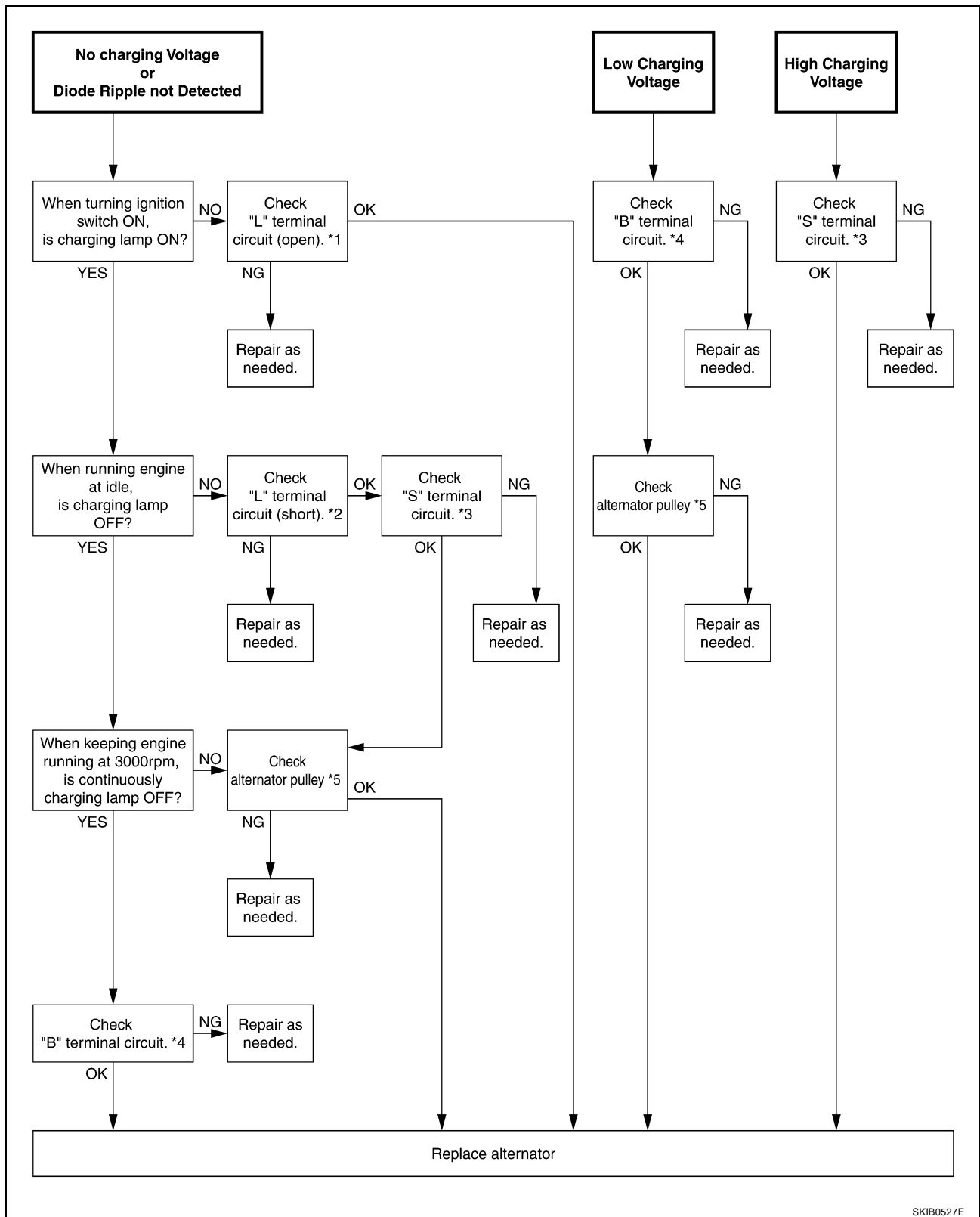


DIAGNOSTIC RESULT ITEM CHART

Diagnostic item	Service procedure
CHARGING SYSTEM NORMAL	Charging system is normal and will also show DIODE RIPPLE test result.
NO CHARGING VOLTAGE	Go to SC-20 , " WORK FLOW ".
LOW CHARGING VOLTAGE	
HIGH CHARGING VOLTAGE	
DIODE RIPPLE NORMAL	Diode ripple is OK and will also show CHARGING VOLTAGE test result.
EXCESS RIPPLE DETECTED	Replace the alternator. Perform "DIODE RIPPLE" test again using Battery/Starting/Charging system tester to confirm repair.
DIODE RIPPLE NOT DETECTED	Go to SC-20 , " WORK FLOW ".

CHARGING SYSTEM

WORK FLOW



SKIB0527E

- *1 [SC-22, "Check "L" Terminal Circuit \(Open\)"](#) *2 [SC-22, "Check "L" Terminal Circuit \(Short\)"](#) *3 [SC-23, "Check "S" Terminal Circuit"](#)
 *4 [SC-24, "Check "B" Terminal Circuit"](#) *5 [SC-26, "ALTERNATOR PULLEY INSPECTION"](#)

CHARGING SYSTEM

PRELIMINARY INSPECTION

1. CHECK BATTERY TERMINALS CONNECTION

Check if battery terminals is clean and tight.

OK or NG

OK >> GO TO 2.

NG >> Repair battery terminals connection.

2. CHECK FUSE AND FUSIBLE LINK

Check for blown fuse and fusible link.

Unit	Power source (Power supply terminals)	Fuse and fusible link No.
Alternator	Battery ("S" terminal)	56
Combination meter	Ignition switch ON ("L" terminal)	9

OK or NG

OK >> GO TO 3.

NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse.

3. CHECK "E" TERMINAL CONNECTION

Check if "E" terminal is clean and tight.

OK or NG

OK >> GO TO 4.

NG >> Repair "E" terminal connection.

4. CHECK ALTERNATOR DRIVE BELT TENSION

Check alternator drive belt tension. Refer to [EM-14, "Checking Drive Belts"](#) .

OK or NG

OK >> INSPECTION END

NG >> Repair as needed.

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CHARGING SYSTEM

DIAGNOSTIC PROCEDURE 1

Check "L" Terminal Circuit (Open)

1. CHECK "L" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check 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 (OPEN)

1. Disconnect alternator connector.
2. Apply ground to alternator harness connector E310 terminal 3 (G) with the ignition switch in the ON position.

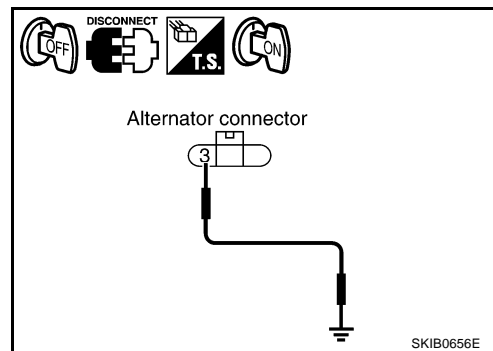
3 (G) – Ground : CHARGE lamp should light up.

OK or NG

OK >> Go to [SC-20, "WORK FLOW"](#) .

NG >> Check the following.

- Harness for open between combination meter and alternator
- Harness for open between combination meter and fuse
- Charge warning lamp (Combination meter)



DIAGNOSTIC PROCEDURE 2

Check "L" Terminal Circuit (Short)

1. CHECK "L" TERMINAL CIRCUIT (SHORT)

1. Turn ignition switch OFF.
2. Disconnect alternator connector.
3. Turn ignition switch ON.

CHARGE lamp should light up?

YES >> Check the following.

- Harness for short between combination meter and alternator
- Charge warning lamp (Combination meter)

NO >> Go to [SC-20, "WORK FLOW"](#) .

CHARGING SYSTEM

DIAGNOSTIC PROCEDURE 3

Check "S" Terminal Circuit

1. CHECK "S" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check 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 "S" TERMINAL CIRCUIT

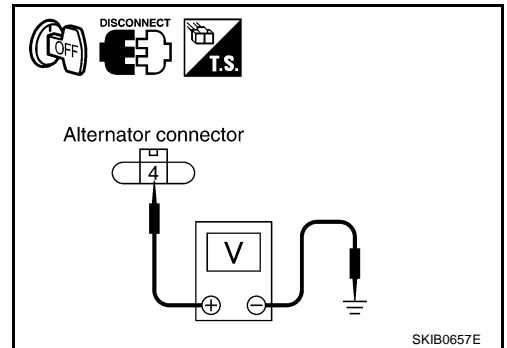
Check voltage between alternator harness connector E310 terminal 4 (P) and ground.

4 (P) – Ground : Battery voltage

OK or NG

OK >> Go to [SC-20, "WORK FLOW"](#).

NG >> Check harness for open between alternator and fuse.



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CHARGING SYSTEM

DIAGNOSTIC PROCEDURE 4

Check "B" Terminal Circuit

1. CHECK "B" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if "B" terminal is clean and tight.

OK or NG

OK >> GO TO 2.

NG >> Repair "B" terminal connection. Confirm repair by performing complete Battery/Starting/Charging system test.

2. CHECK "B" TERMINAL CIRCUIT

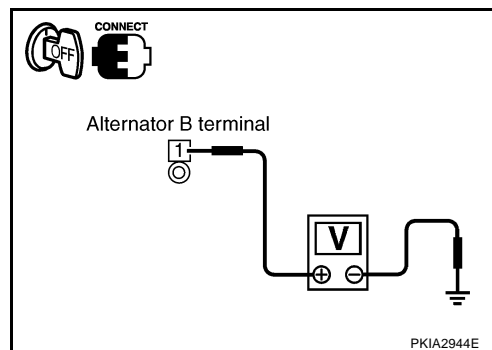
Check voltage between alternator "B" terminal E309 terminal 1 (B/R) and ground.

1 (B/R) – Ground : Battery voltage

OK or NG

OK >> GO TO 3.

NG >> Check harness for open between alternator and fusible link.



3. CHECK "B" TERMINAL CONNECTION (VOLTAGE DROP TEST)

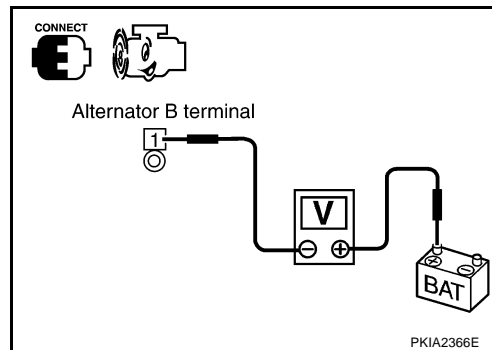
1. Start engine.
2. When engine running at idle and warm, check voltage between alternator "B" terminal E309 terminal 1 (B/R) and battery positive terminal.

1 (B/R) – Battery positive terminal : Less than 0.2 V

OK or NG

OK >> Go to [SC-20. "WORK FLOW"](#).

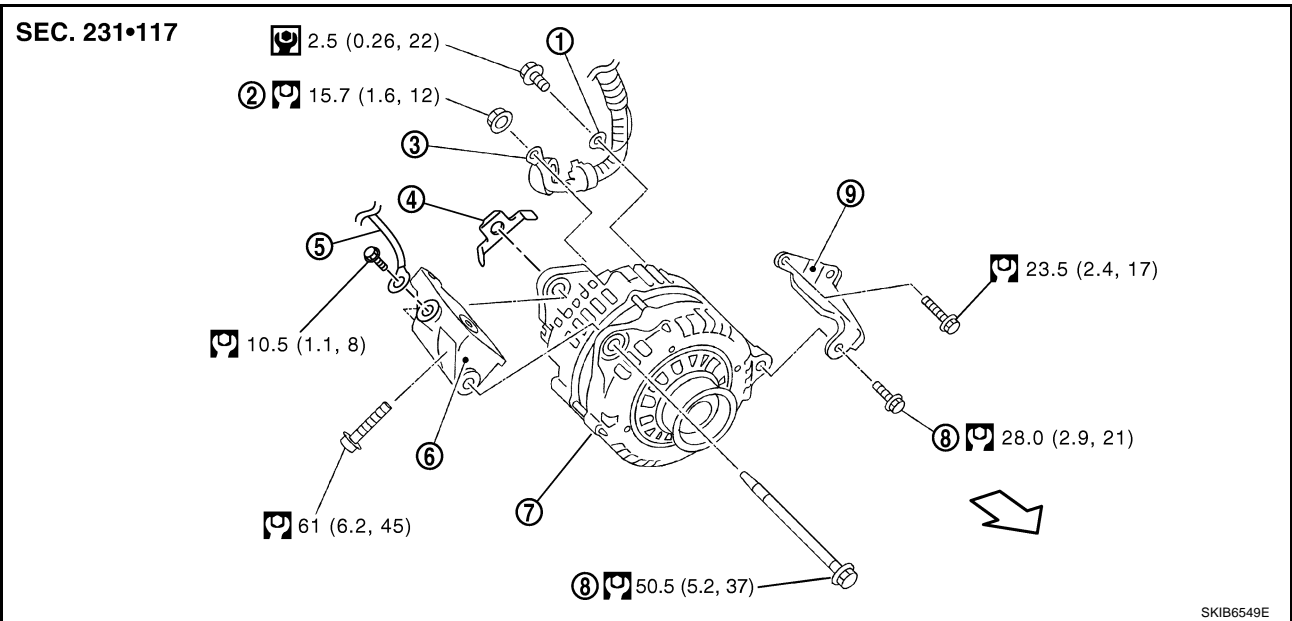
NG >> Check harness between battery and alternator for poor continuity.



CHARGING SYSTEM

Removal and Installation

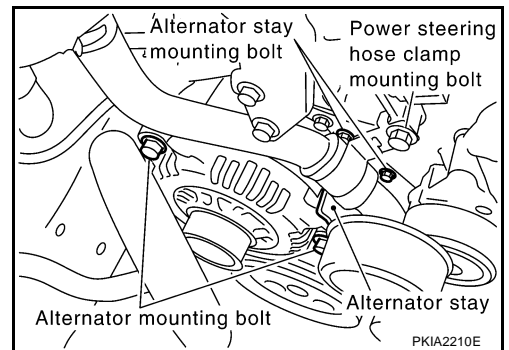
NKS0016W



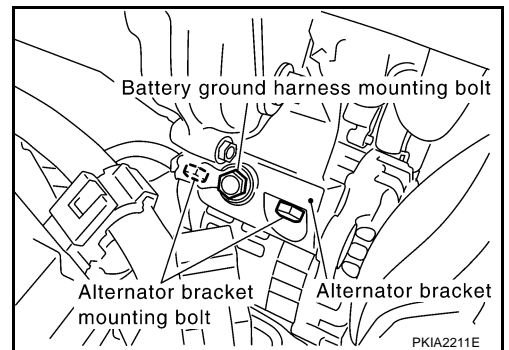
- | | | |
|------------------------------|-----------------------------|-------------------------|
| 1. Alternator ground harness | 2. "B" terminal nut | 3. "B" terminal harness |
| 4. Alternator nut | 5. Battery ground harness | 6. Alternator bracket |
| 7. Alternator | 8. Alternator mounting bolt | 9. Alternator stay |
- : N·m (kg-m, in-lb)
 : N·m (kg-m, ft-lb)
 : Engine front

REMOVAL

1. Remove battery. Refer to [SC-8, "Removal and Installation"](#) .
2. Remove air intake duct. Refer to [EM-17, "AIR CLEANER AND AIR DUCT"](#) .
3. Remove alternator, water pump and A/C compressor belt. Refer to [EM-14, "Removal and Installation"](#) .
4. Remove alternator mounting bolts.
5. Remove power steering hose clamp mounting bolt.
6. Remove alternator stay mounting bolts and alternator stay.



7. Remove battery ground harness mounting bolt.
8. Remove alternator bracket mounting bolts and alternator bracket.

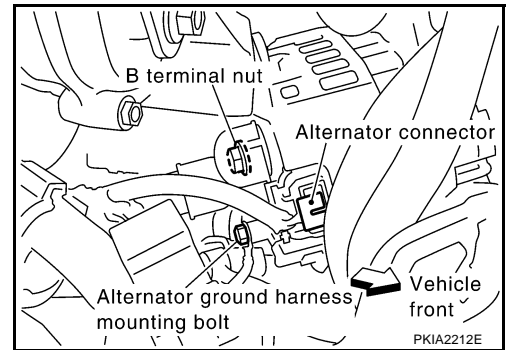


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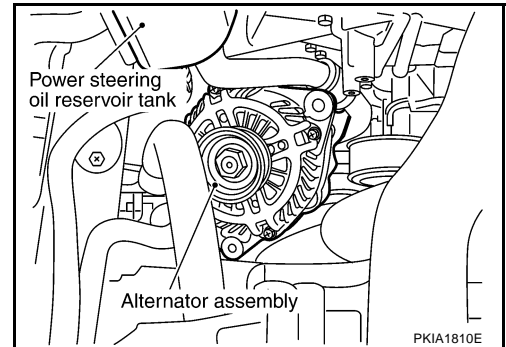
SC

CHARGING SYSTEM

9. Disconnect alternator connector.
10. Remove B terminal nut.
11. Remove alternator ground harness mounting bolt.



12. Remove power steering oil reservoir tank mounting bolts, then slide power steering oil reservoir tank.
13. Remove alternator assembly upward.



ALTERNATOR PULLEY INSPECTION

Perform the following.

- Make sure that alternator pulley does not rattle.
- Make sure that alternator pulley nut is tight.

Alternator pulley nut:

: 118 N·m (12.0 kg·m, 87 ft·lb)

INSTALLATION

Installation is the reverse order of removal, note the following point.

- Install alternator, and check tension of belt. Refer to [EM-14, "Checking Drive Belts"](#).

CAUTION:

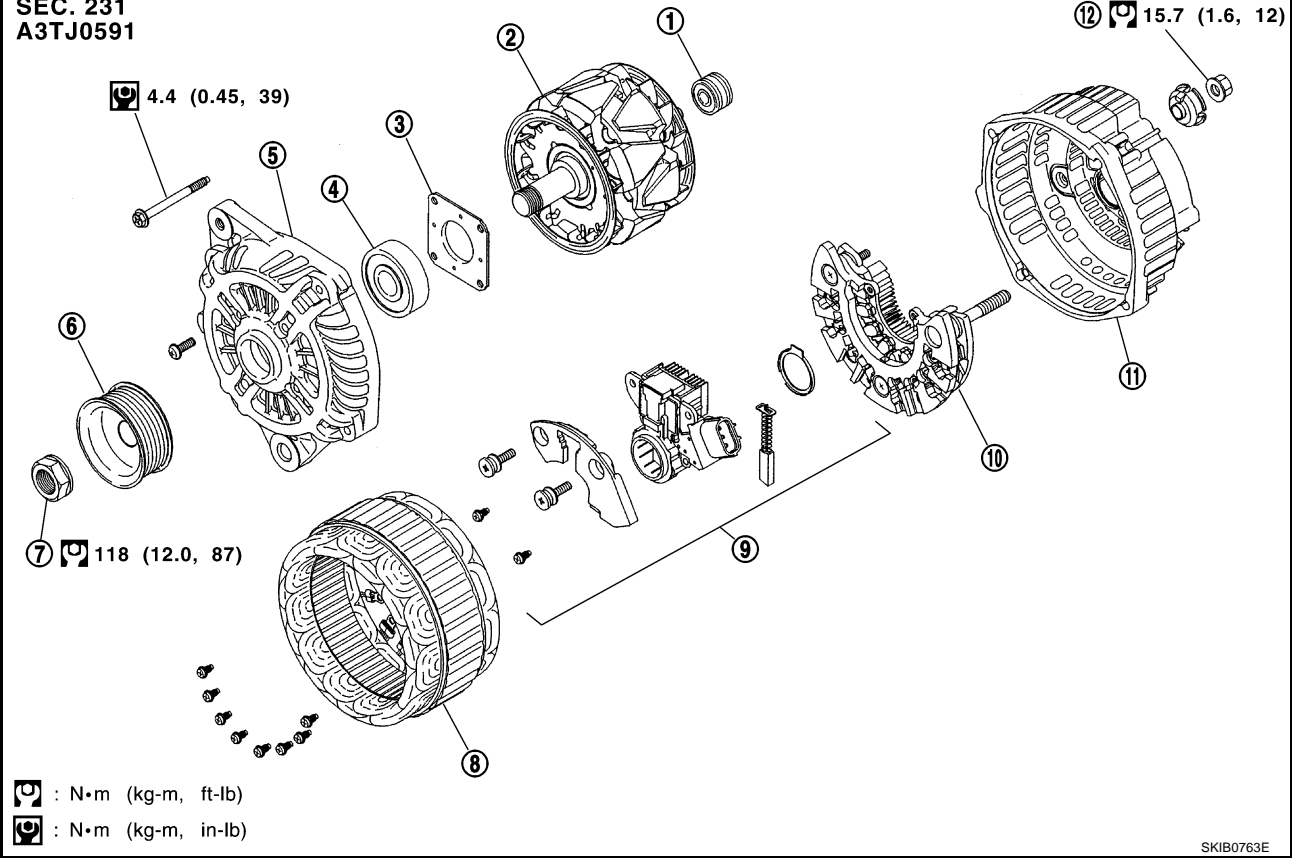
Be sure to tighten "B" terminal nut carefully.

CHARGING SYSTEM

Disassembly and Assembly

NKS0016X

SEC. 231
A3TJ0591



SKIB0763E

- | | | |
|--------------------|----------------|----------------------------------|
| 1. Rear bearing | 2. Rotor | 3. Retainer |
| 4. Front bearing | 5. Front cover | 6. Pulley |
| 7. Pulley nut | 8. Stator | 9. IC voltage regulator assembly |
| 10. Diode assembly | 11. Rear cover | 12. B terminal nut |

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SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Battery

NKS0016Y

Type	80D23L
20 hour rate capacity	12 V - 62 AH
Cold cranking current (For reference value)	582 A

Starter

NKS0016Z

Type		M2T85171
		MITSUBISHI make
		Reduction gear type
System voltage		12 V
No-load	Terminal voltage	11 V
	Current	Less than 145 A
	Revolution	More than 3,300 rpm
Minimum diameter of commutator		31.4 mm (1.236 in)
Minimum length of brush		11.0 mm (0.433 in)
Brush spring tension		30.9 - 37.7 N (3.15 - 3.85 kg, 6.95 - 8.47 lb)
Clearance between bearing metal and armature shaft		Less than 0.2 mm (0.008 in)
Clearance between pinion front edge and pinion stopper		0.5 - 2.0 mm (0.020 - 0.079 in)

Alternator

NKS00170

Type		A3TJ0591
		MITSUBISHI make
Nominal rating		12 V - 150 A
Ground polarity		Negative
Minimum revolution under no-load (When 13.5 V is applied)		Less than 1,000 rpm
Hot output current (When 13.5 V is applied)		More than 35 A / 1,300 rpm More than 105 A / 2,500 rpm More than 136 A / 5,000 rpm
Regulated output voltage		14.1 - 14.7 V
Minimum length of brush		More than 5.00 mm (0.197 in)
Brush spring pressure		4.1 - 5.3 N (418 - 540 g, 14.8 - 19.1 oz)
Slip ring minimum outer diameter		More than 22.1 mm (0.870 in)
Rotor (Field coil) resistance		1.6 - 2.0 Ω