SECTION SC
STARTING & CHARGING SYSTEM

CONTENTS

PRECAUTIONS

PFP:00001

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

NKS002UK

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:

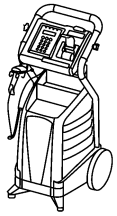
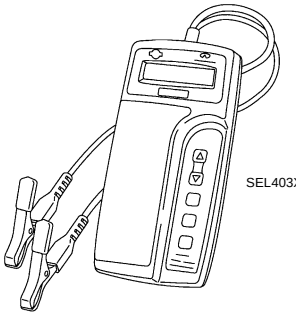
- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal 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

PFP:00002

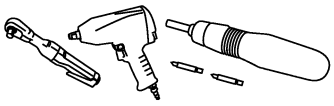
Special Service Tools

NKS0056N

Tool number (Kent-Moore No.) Tool name	Description
— (J-48087) Battery Service Center  WKIA5280E	Tests battery. For operating instructions, refer to Technical Service Bulletin and Battery Service Center User Guide.
— (J-44373 Model MCR620) Starting/Charging System Tester  SEL403X	Tests starting and charging systems. For operating instructions, refer to Technical Service Bulletin.

Commercial Service Tools

NKS0056O

Tool name	Description
Power tool  PIIB1407E	Loosening bolts, nuts and screws

BATTERY

PFP:AYBGL

How to Handle Battery

NKS0056P

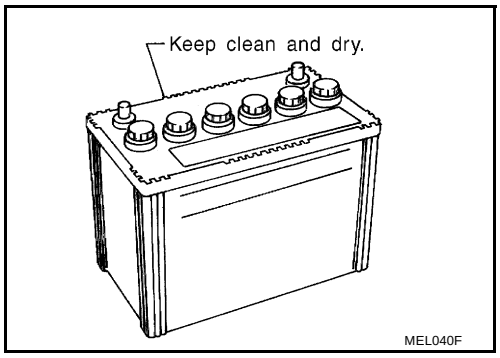
CAUTION:

- **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.**

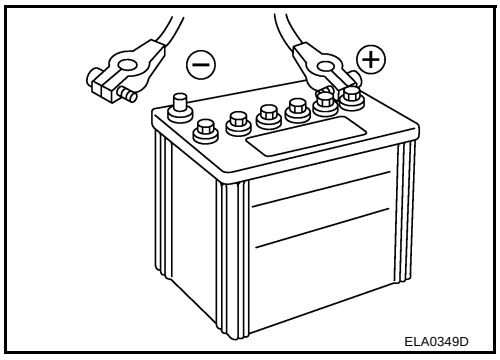
METHODS OF PREVENTING OVER-DISCHARGE

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

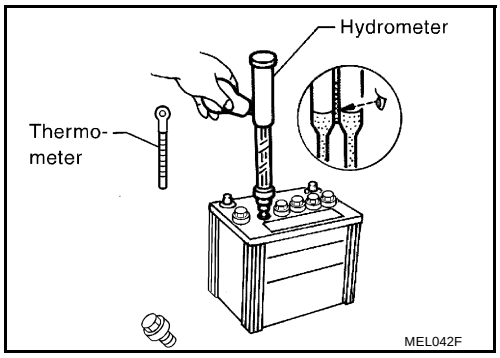
- The battery surface (particularly its top) should always be kept clean and dry.
- The terminal connections should be clean and tight.
- At every routine maintenance, check the electrolyte level.
  This also applies to batteries designated as “low maintenance” and “maintenance-free”.



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



- 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.

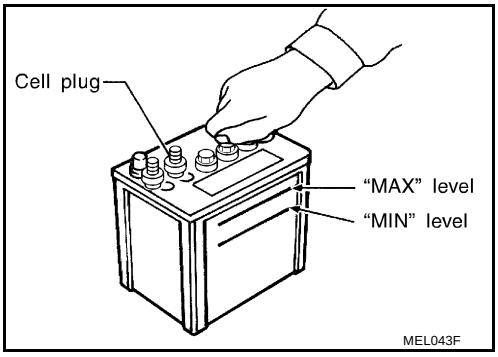


CHECKING ELECTROLYTE LEVEL

WARNING:

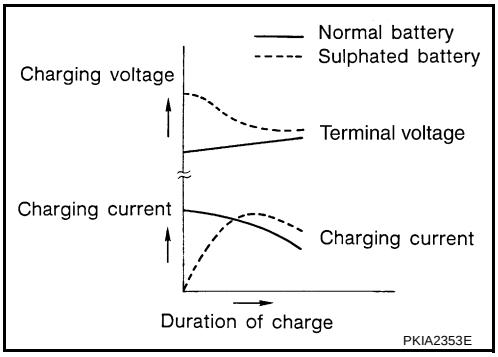
Never allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, never touch or rub your eyes until you have thoroughly washed your hands. If acid contacts eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

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



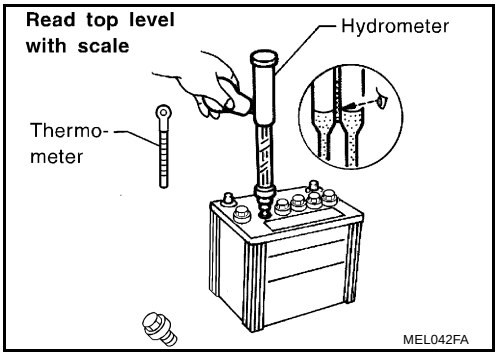
Sulphation

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

Battery electrolyte temperature °C (°F)	Add to specific gravity reading
16 (60)	–0.008
10 (50)	–0.012
4 (40)	–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

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

Never 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 Diagnoses with Battery Service Center

NKS0056Q

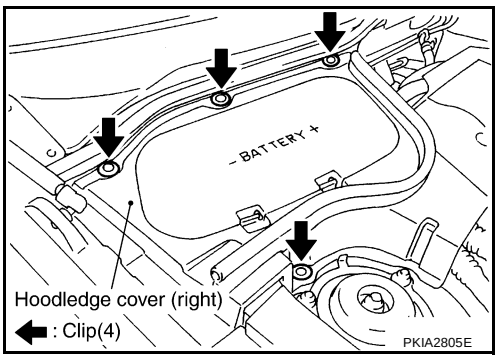
For battery testing, use Battery Service Center (J-48087). For details and operating instructions, refer to Technical Service Bulletin and/or Battery Service Center User Guide.

Removal and Installation

NKS002UP

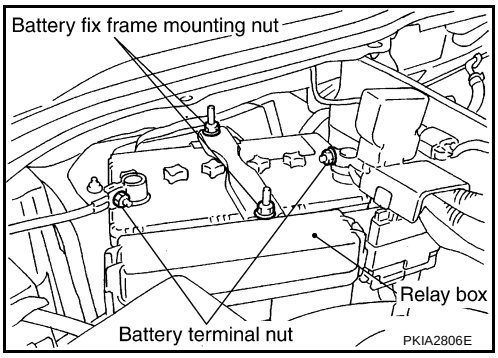
REMOVAL

1. Remove hoodledge cover (right).



2. Disconnect both battery cables from terminals.

   CAUTION:
   When disconnecting, disconnect the battery cable from the negative terminal first.
3. Remove battery fix frame mounting nuts and battery fix frame.
4. Remove relay box from bracket.
5. Remove battery.



INSTALLATION

Installation is the reverse order of removal.

CAUTION:
When connecting, connect the battery cable to the positive terminal first.

Battery fix frame mounting nut

: 3.9 N·m (0.4 kg-m, 35 in-lb)

Battery terminal nut

: 5.4 N·m (0.55 kg-m, 48 in-lb)

STARTING SYSTEM

PFP:23300

System Description

NKS002UQ

Power is supplied at all times

- through 40A fusible link (letter F, located in the fuse and fusible link block)
- to ignition switch terminal 1,
- through 15A fuse (No. 78, located in the IPDM E/R)
- to CPU of IPDM E/R,
- through 10A fuse (No. 71, located in the IPDM E/R)
- to CPU of IPDM E/R.

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

- from TCM, and through A/T assembly terminal 9
- to IPDM E/R terminal 53.

Ground is supplied

- to IPDM E/R terminals 38, 50 and 60
- from grounds E21, E50 and E51.

With the ignition switch in the START position, and provided that the IPDM E/R receives a starter relay ON signal from the CAN lines, the IPDM E/R is energized and power is supplied

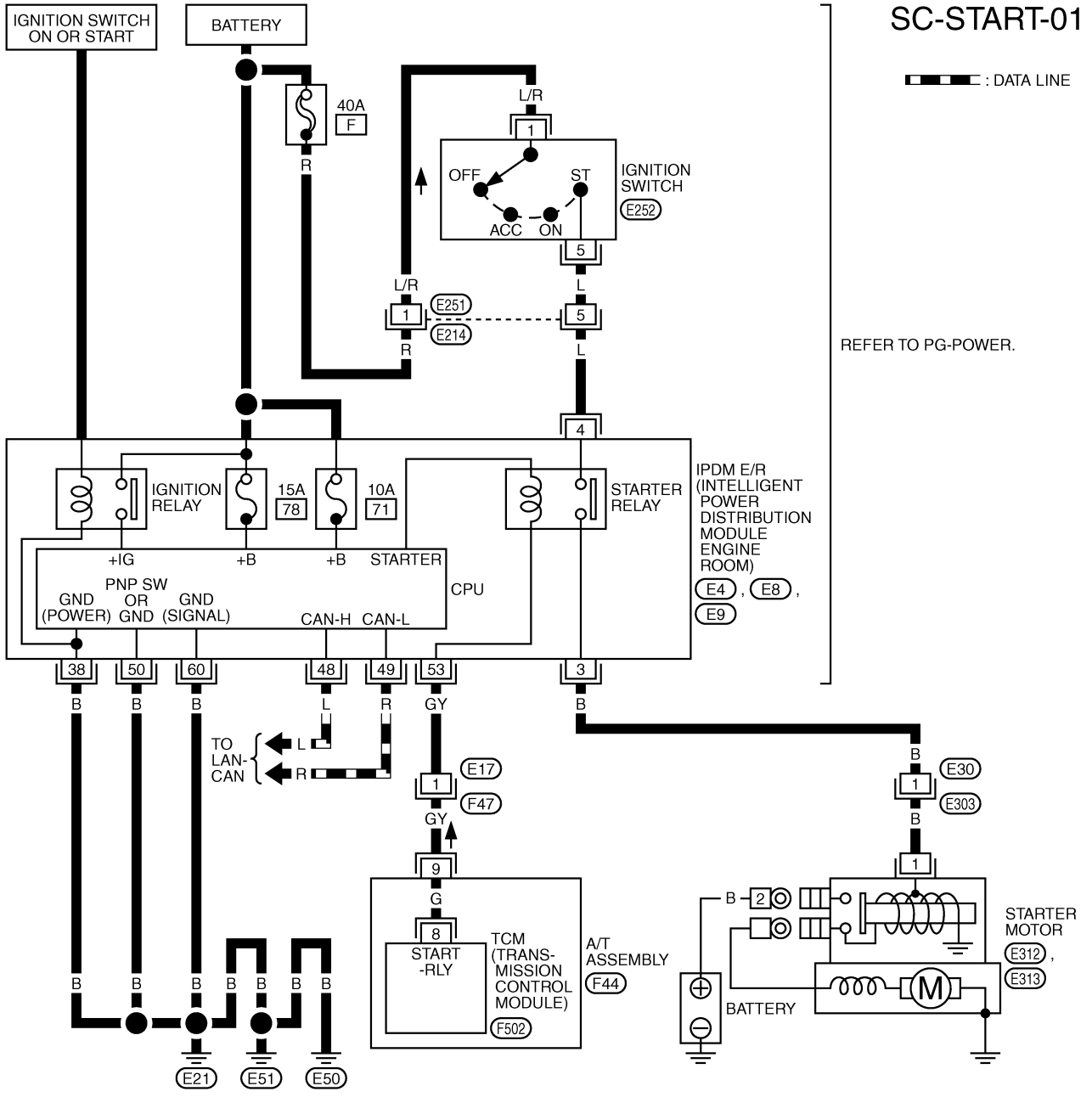
- from ignition switch terminal 5
- to IPDM E/R terminal 4 and
- through IPDM E/R terminal 3
- to starter motor terminal 1.

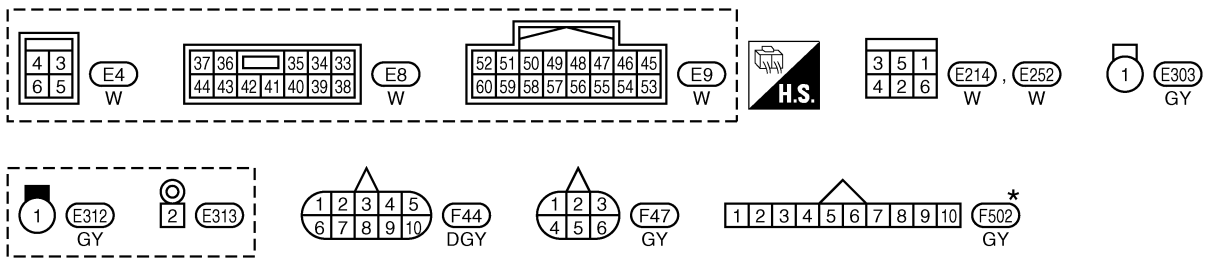
The starter motor plunger closes and provides a closed circuit between the battery and starter motor. The starter motor is grounded to the engine block. With power and ground supplied, cranking occurs and the engine starts.

Wiring Diagram — START —

NKS002UR

VK45DE ENGINE MODELS

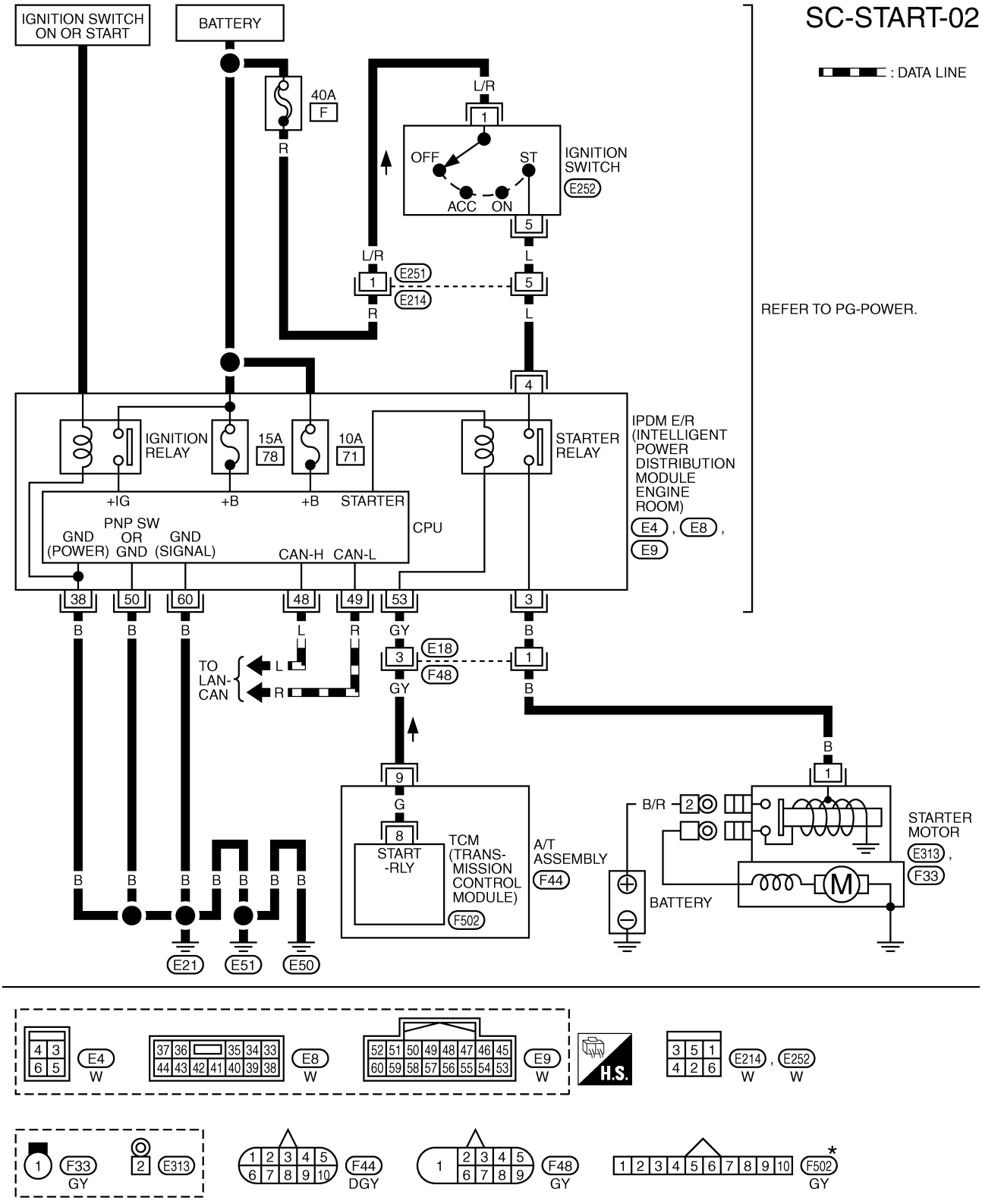




*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

TKWM1275E

VQ35DE ENGINE MODELS



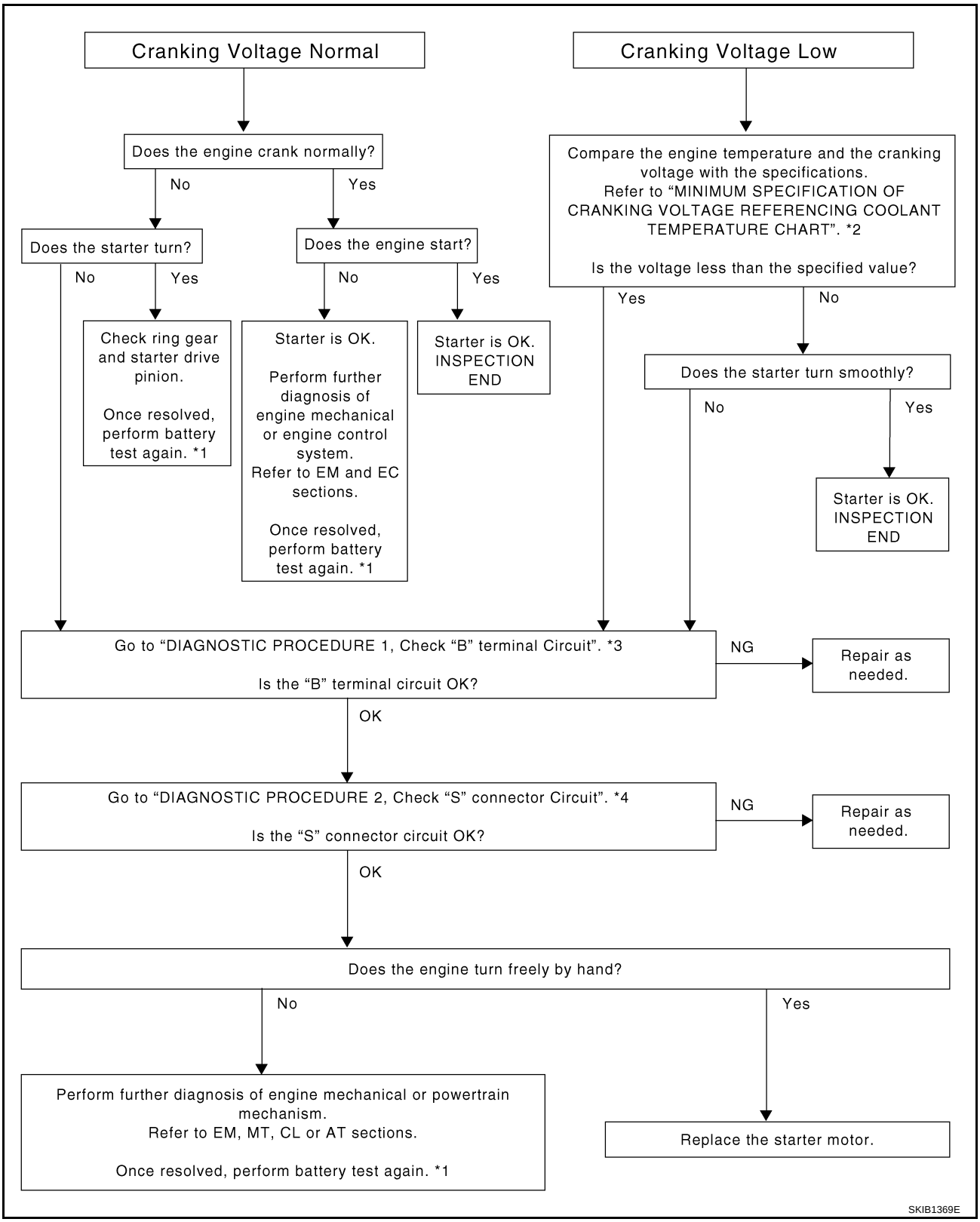
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

TKWM1276E

Trouble Diagnosis with Starting/Charging System Tester (Starting)

NKS002US

For starting system testing, use Starting/Charging System Tester (J-44373). For details and operating instructions, refer to Technical Service Bulletin.



*1 For battery testing, use Battery Service Center (J-48087). For details and operating instructions, refer to Technical Service Bulletin and/or Battery Service Center User Guide.

*2 SC-13, "MINIMUM SPECIFICATION OF CRANKING VOLTAGE REFERENCING COOLANT TEMPERATURE"

*3 SC-12, "Check “B” Terminal Circuit"

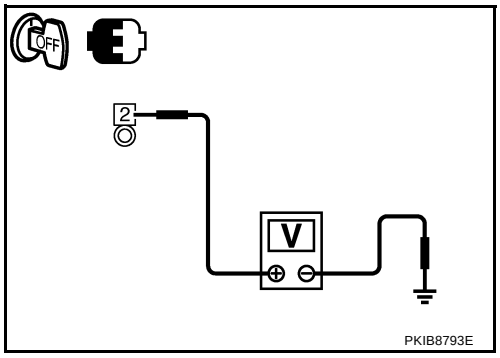
*4 SC-13, "Check “S” Connector Circuit"

DIAGNOSTIC PROCEDURE 1
Check “B” Terminal Circuit

1. CHECK POWER SUPPLY FOR STARTER MOTOR “B” TERMINAL

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 the starter motor “B” terminal E313 terminal 2 connection is clean and tight.
5. Check voltage between starter motor “B” terminal E313 terminal 2 and ground.

2 – Ground : Battery voltage



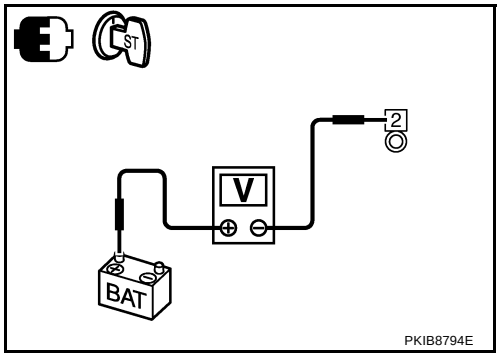
OK or NG

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

2. CHECK BATTERY CABLE CONNECTION (VOLTAGE DROP TEST)

Check voltage between starter motor “B” terminal E313 terminal 2 and battery positive terminal.

2 – Battery positive terminal
When ignition switch is in START position : Less than 0.5 V



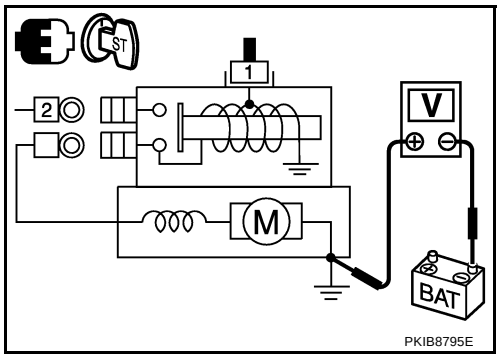
OK or NG

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

3. CHECK STARTER MOTOR GROUND CIRCUIT (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 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-11, "Trouble Diagnosis with Starting/Charging System Tester (Starting)" .
NG >> Check starter motor case and ground for poor continuity.

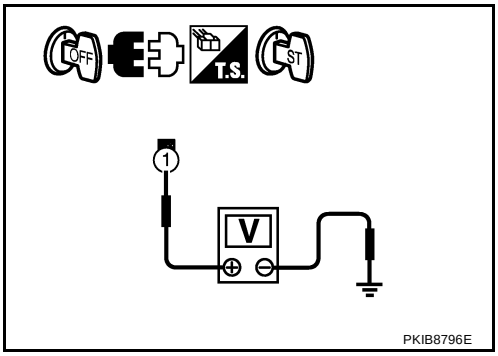
DIAGNOSTIC PROCEDURE 2
Check “S” Connector Circuit

1. CHECK POWER SUPPLY FOR STARTER MOTOR “S” TERMINAL

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 (VK45DE) or F33 (VQ35DE) terminal 1 and ground.

1 – Ground

When ignition switch is in START position **: Battery voltage**



OK or NG

OK >> “S” connector circuit is OK. Further inspection necessary. Refer to SC-11, "Trouble Diagnosis with Starting/ Charging System Tester (Starting)" .

NG >> Check the following.

- 40A fusible link (letter F , located in fuse and fusible link box)
- Ignition switch
- Starter relay (within the IPDM E/R)
- Harness for open or short

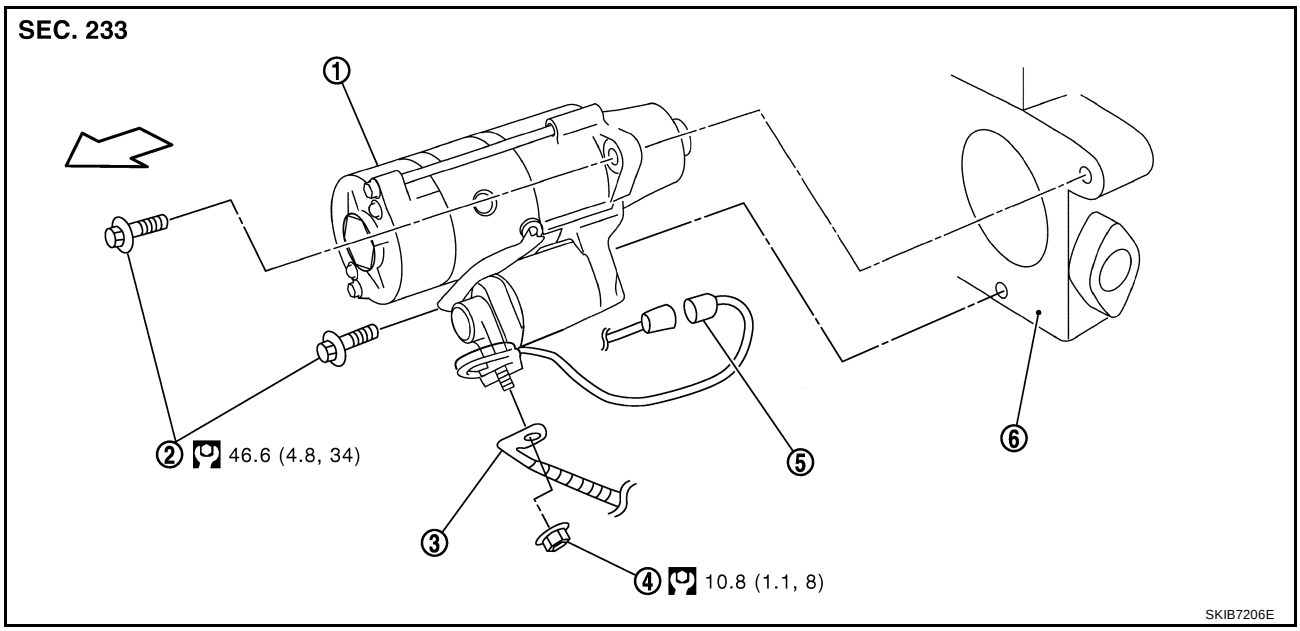
MINIMUM SPECIFICATION OF CRANKING VOLTAGE REFERENCING COOLANT TEMPERATURE

Engine coolant temperature	Voltage [V]
–30°C to –20°C (–22°F to –4°F)	8.4
–19°C to –10°C (–2°F to 14°F)	8.9
–9°C to 0°C (16°F to 32°F)	9.3
More than 1°C (More than 34°F)	9.7

Removal and Installation

NKS002UT

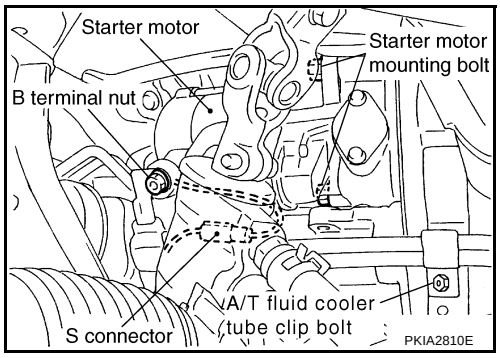
VK45DE ENGINE MODELS



1. Starter motor	2. Starter motor mounting bolt	3. B terminal harness
4. B terminal nut	5. S connector	6. Cylinder block
: N·m (kg-m, ft-lb)	: Engine front	

Removal

1. Disconnect the battery cable from the negative terminal.
2. Remove engine front and rear undercover, using power tools.
3. Disconnect “S” connector.
4. Remove “B” terminal nut.
5. Remove starter motor mounting bolts.
6. Loosen A/T fluid cooler tube clip bolts. Refer to AT-266, "TRANSMISSION ASSEMBLY" .
7. Remove starter motor downward from the vehicle.



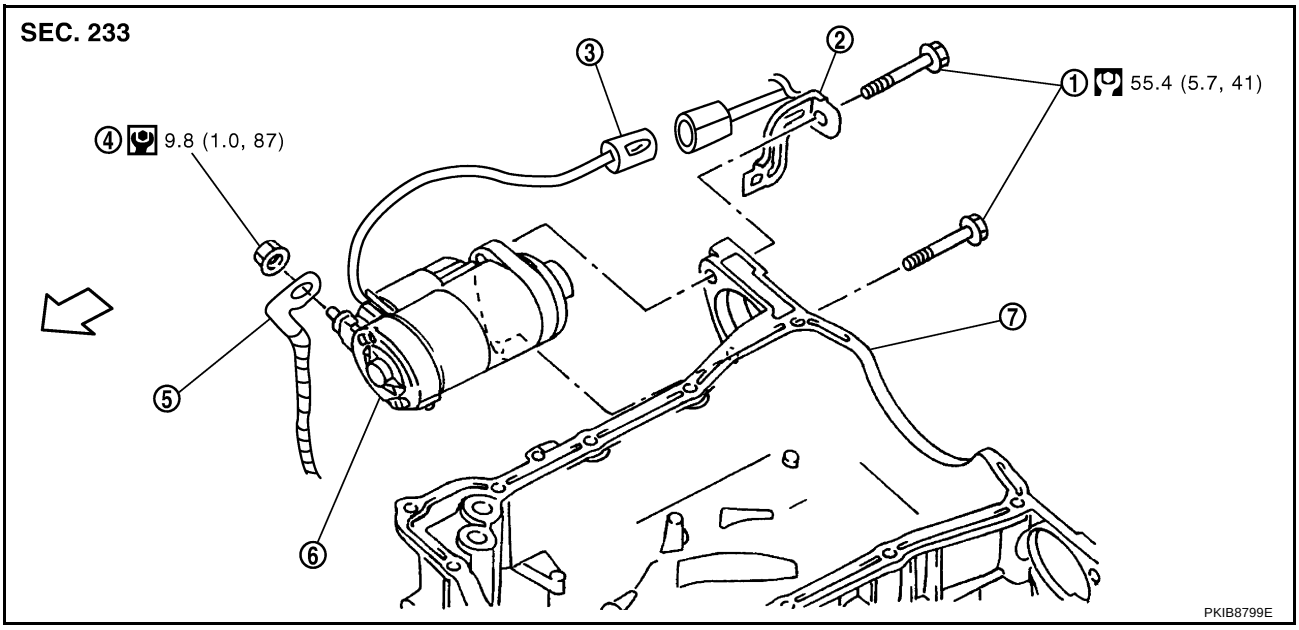
Installation

Installation is the reverse order of removal.

CAUTION:

Be sure to tighten “B” terminal nut carefully.

VQ35DE ENGINE MODELS (2WD)

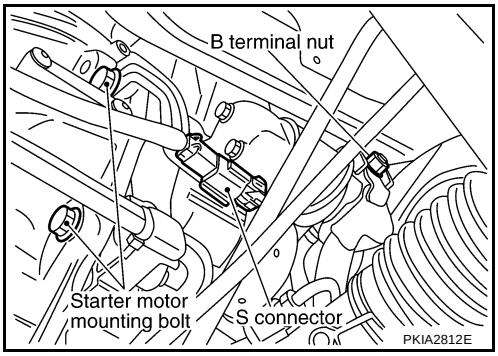


1. Starter motor mounting bolt
2. Harness clip bracket
3. S connector
4. B terminal nut
5. B terminal harness
6. Starter motor
7. Oil pan

: N·m (kg-m, ft-lb)
: N·m (kg-m, in-lb)
: Engine front

Removal

1. Disconnect the battery cable from the negative terminal.
2. Remove engine rear undercover, using power tools.
3. Disconnect “S” connector.
4. Remove “B” terminal nut.
5. Remove starter motor mounting bolts and harness clip bracket, using power tools.
6. Remove starter motor downward from the vehicle.



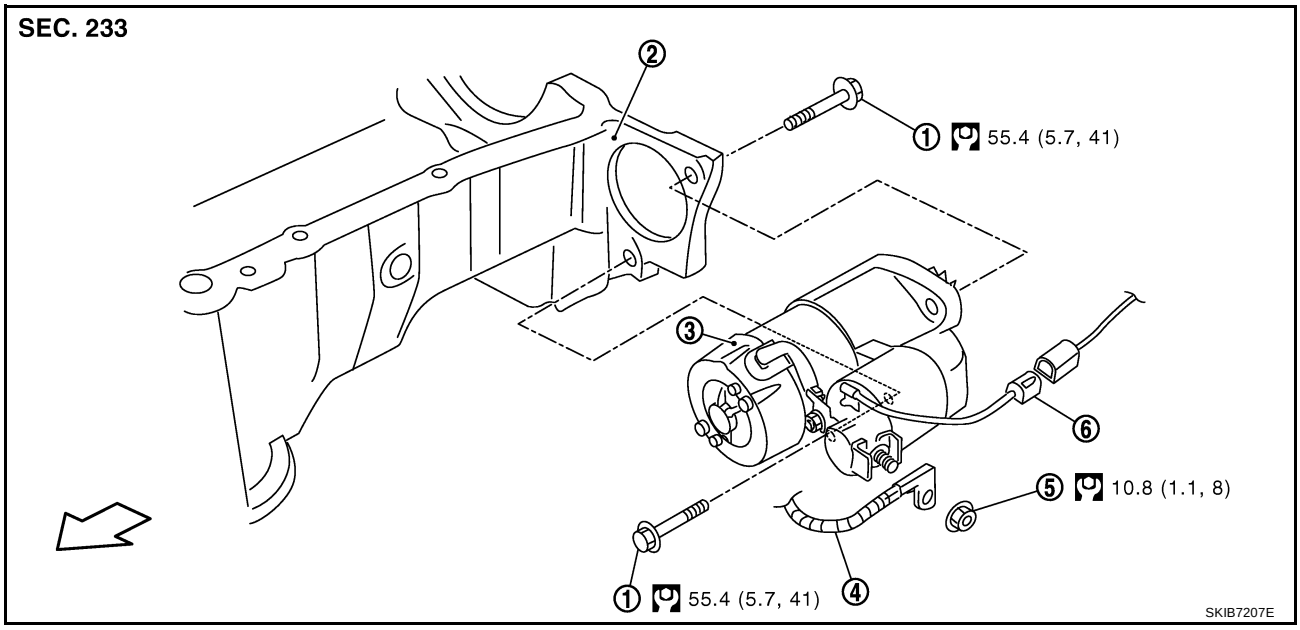
Installation

Installation is the reverse order of removal.

CAUTION:

Be sure to tighten “B” terminal nut carefully.

VQ35DE ENGINE MODELS (AWD)



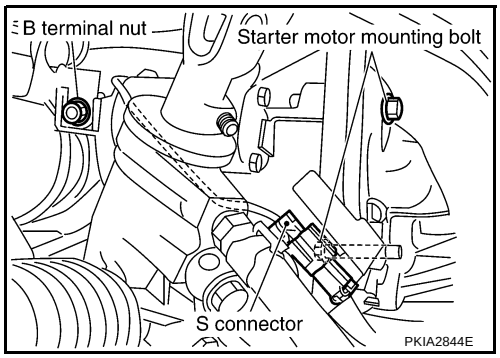
1. Starter motor mounting bolt
2. Oil pan
3. Starter motor
4. B terminal harness
5. B terminal nut
6. S connector

: N·m (kg-m, ft-lb)

⇦ : Engine front

Removal

1. Disconnect the battery cable from the negative terminal.
2. Remove engine front and rear undercover, using power tools.
3. Disconnect “S” connector.
4. Remove “B” terminal nut.
5. Remove starter motor mounting bolts.
6. Remove starter motor downward from the vehicle.



Installation

Installation is the reverse order of removal.

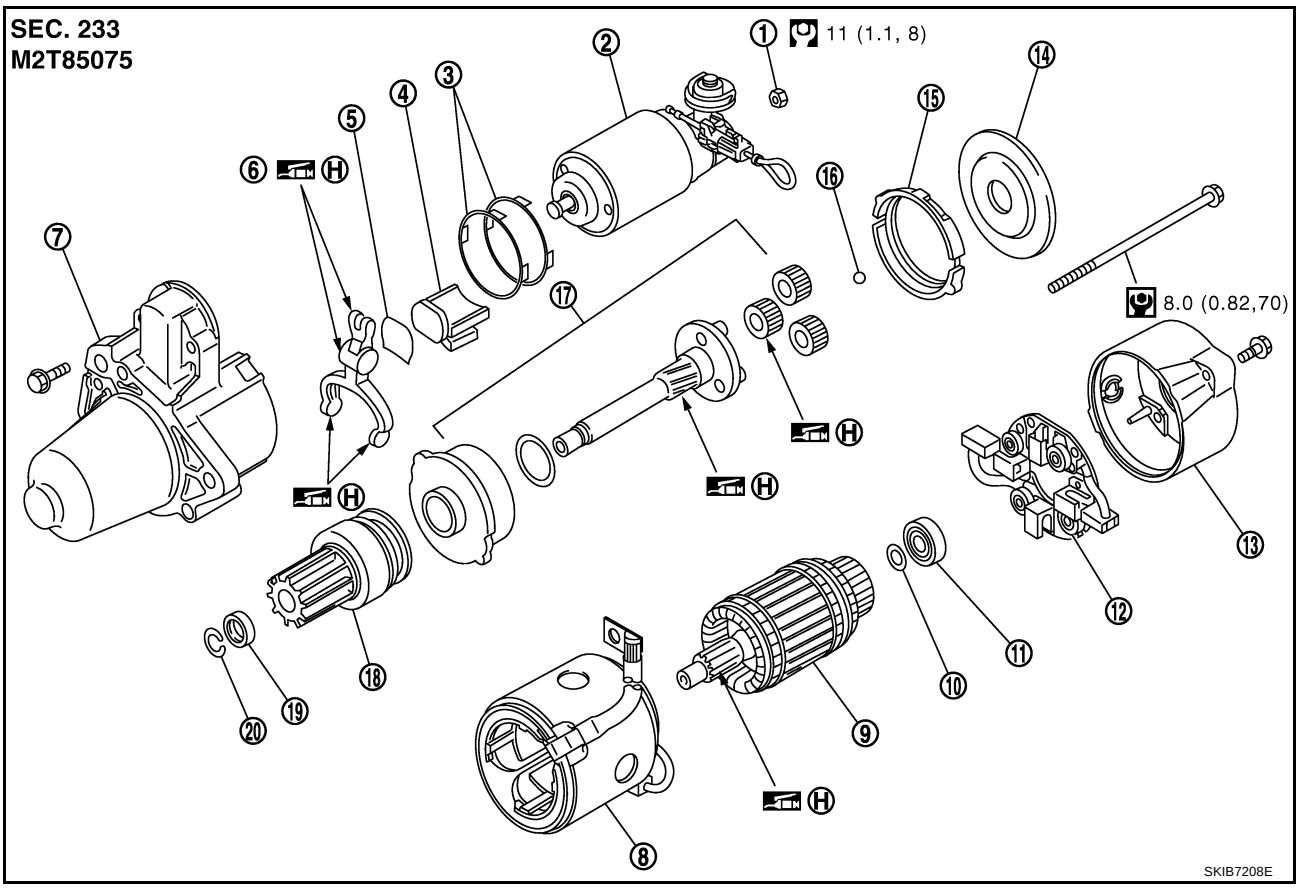
CAUTION:

Be sure to tighten “B” terminal nut carefully.

Disassembly and Assembly

NKS002UU

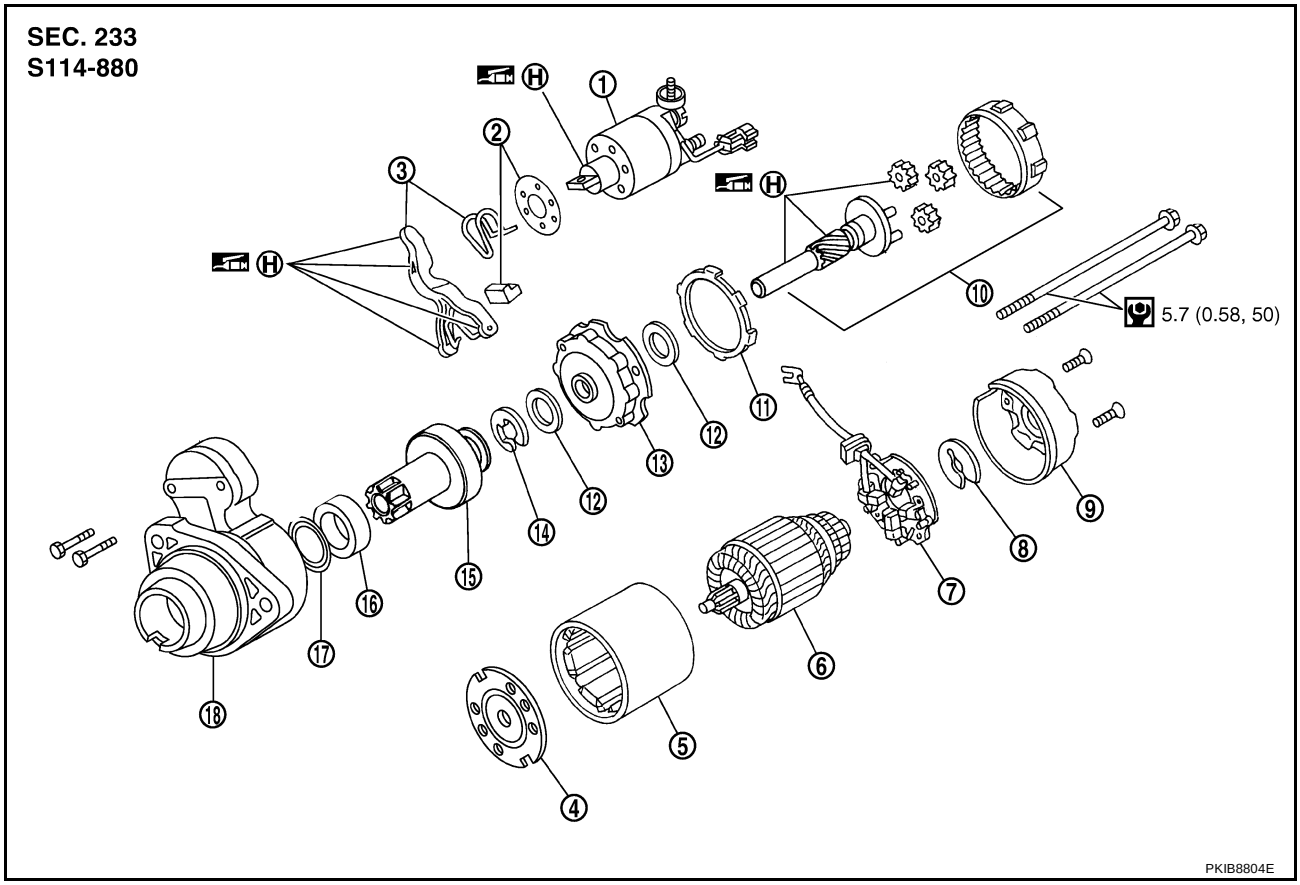
VK45DE ENGINE MODELS



1.	Nut	2.	Magnetic switch assembly	3.	Adjusting plate
4.	Packing	5.	Plate	6.	Shift lever
7.	Front bracket assembly	8.	Yoke assembly	9.	Armature assembly
10.	Washer	11.	Rear bearing	12.	Brush holder assembly
13.	Rear bracket assembly	14.	Cover	15.	Packing
16.	Ball	17.	Shaft gear assembly	18.	Clutch gear assembly
19.	Pinion stopper	20.	Stopper clip		
	: N·m (kg-m, in-lb)		: N·m (kg-m, ft-lb)		(H): High-temperature grease point

VQ35DE ENGINE MODELS (2WD)

SEC. 233
S114-880

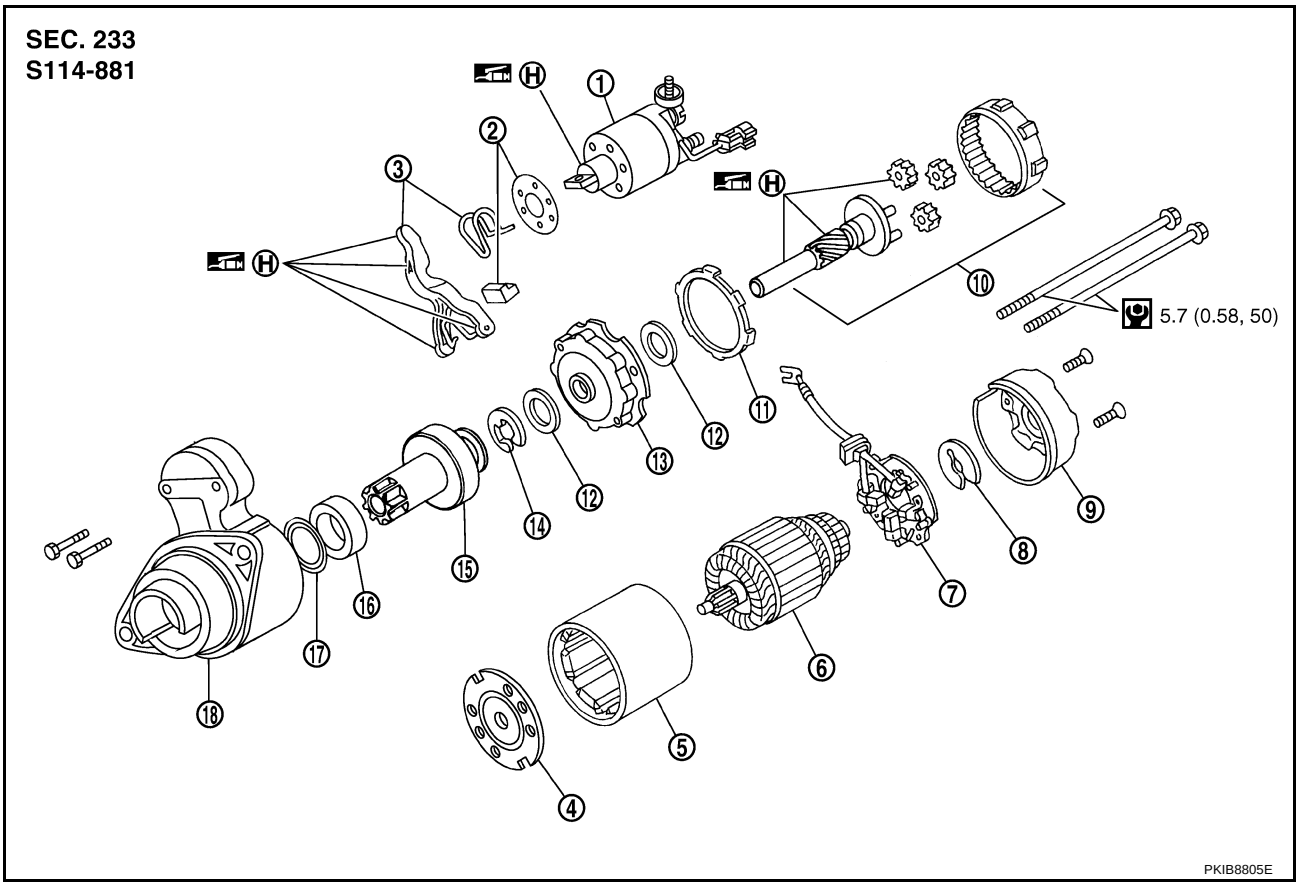


1. Magnetic switch assembly
2. Dust cover kit
3. Shift lever set
4. Center bracket (A)
5. Yoke assembly
6. Armature assembly
7. Brush holder assembly
8. Thrust washer
9. Rear cover assembly
10. Shaft gear assembly
11. Packing
12. Thrust washer
13. Center bracket (P)
14. E-ring
15. Pinion assembly
16. Ball bearing
17. Caul
18. Gear case assembly

: N·m (kg-m, in-lb)

(H): High-temperature grease point

VQ35DE ENGINE MODELS (AWD)



1. Magnetic switch assembly	2. Dust cover kit	3. Shift lever set
4. Center bracket (A)	5. Yoke assembly	6. Armature assembly
7. Brush holder assembly	8. Thrust washer	9. Rear cover assembly
10. Shaft gear assembly	11. Packing	12. Thrust washer
13. Center bracket (P)	14. E-ring	15. Pinion assembly
16. Ball bearing	17. Caul	18. Gear case assembly
: N·m (kg-m, in-lb)	(H): High-temperature grease point	

INSPECTION AFTER DISASSEMBLY

Pinion/Clutch Check

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.

CHARGING SYSTEM

PFP:23100

System Description

NKS002UV

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 10A fuse (No. 33, located in the fuse and fusible link block)
- 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 charging circuit is protected by the 120A fusible link (VK45DE and VQ35DE AWD).
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. 14, located in the fuse block (J/B)]
- to combination meter terminal 7 for the charge warning lamp.

Ground is supplied

- to combination meter terminal 2
- through alternator terminal 3 (“L” terminal)
- to alternator terminal 2 (“E” terminal) (VK45DE) or through case ground (VQ35DE)
- through ground E304 (VK45DE).

With power and ground supplied, 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 charge warning lamp, if any of the following symptoms occur while alternator is operating:

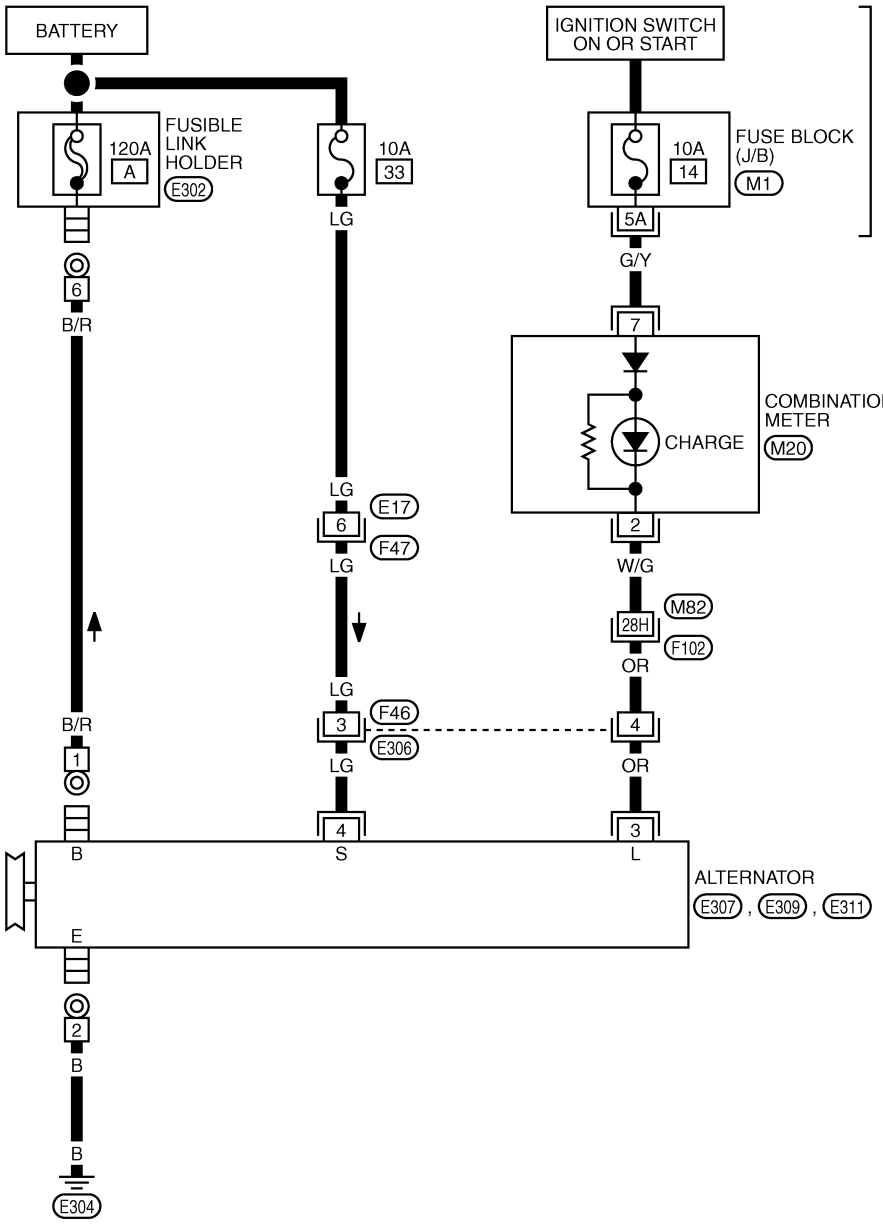
- Excessive voltage is produced.
- No voltage is produced.

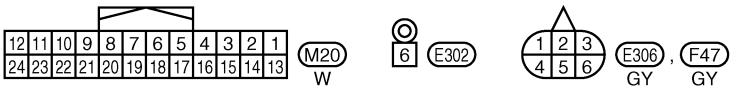
Wiring Diagram — CHARGE —

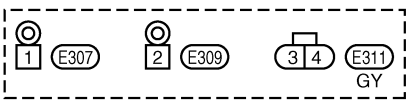
NKS002UW

VK45DE ENGINE MODELS

SC-CHARGE-01







REFER TO THE FOLLOWING.

F102 -SUPER MULTIPLE JUNCTION (SMJ)

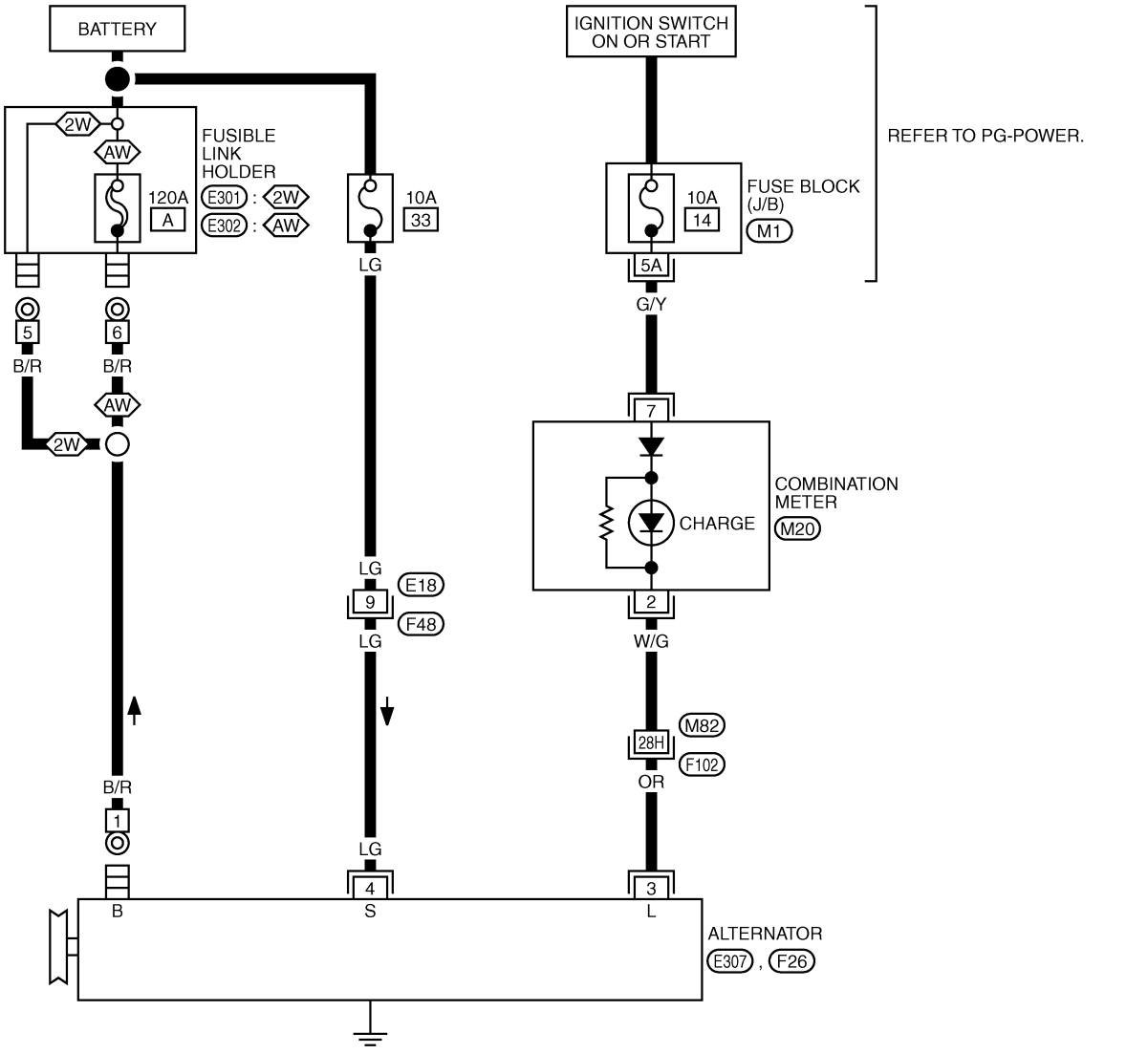
M1 -FUSE BLOCK-JUNCTION BOX (J/B)

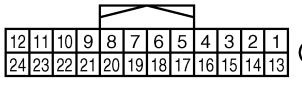
TKWM4287E

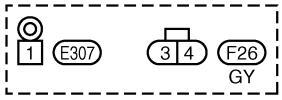
VQ35DE ENGINE MODELS

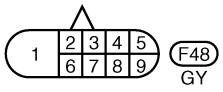
SC-CHARGE-02

2W : 2WD MODELS
AW : AWD MODELS









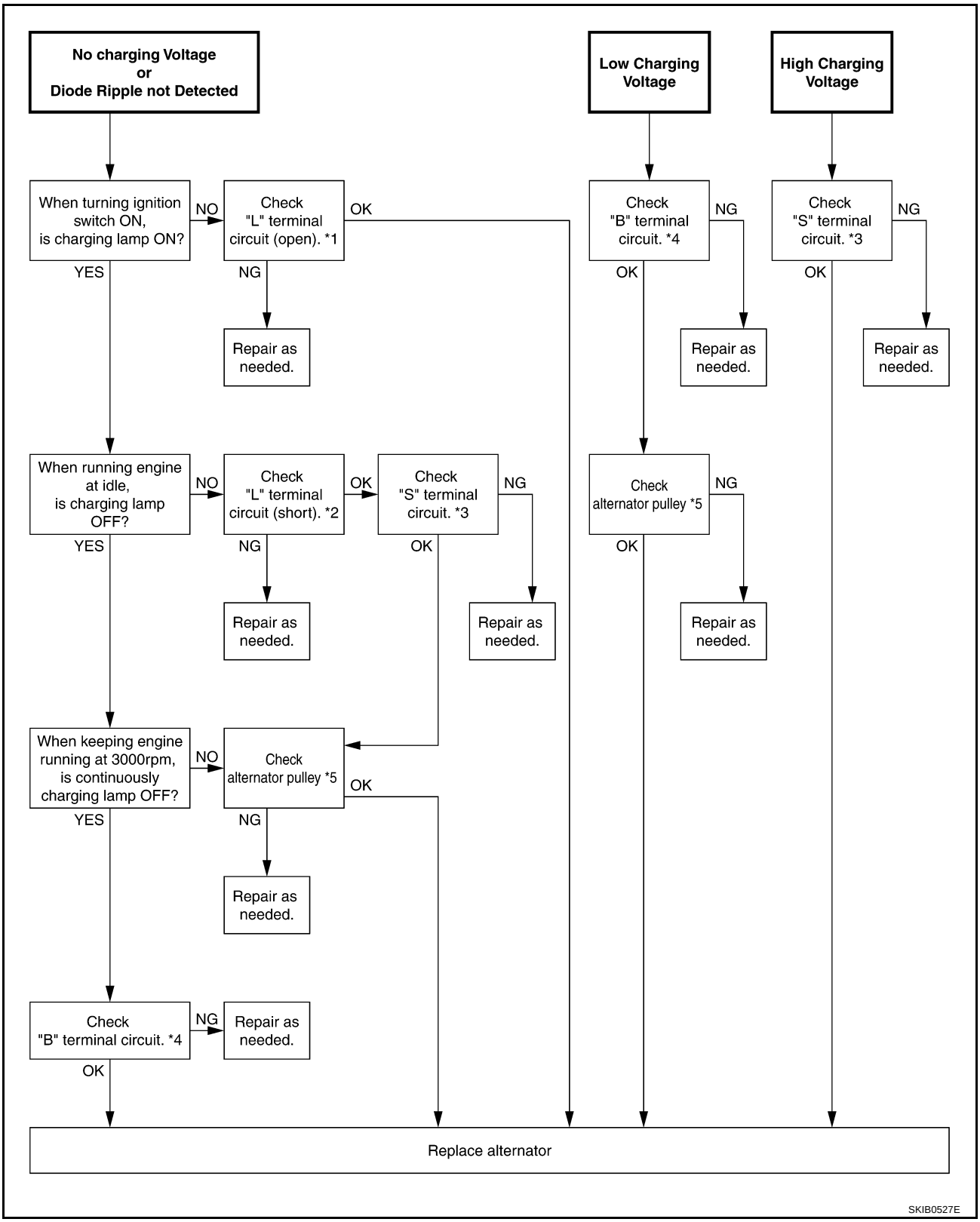
REFER TO THE FOLLOWING.
F102 -SUPER MULTIPLE JUNCTION (SMJ)
M1 -FUSE BLOCK-JUNCTION BOX (J/B)

TKWM4288E

Trouble Diagnosis with Starting/Charging System Tester (Charging)

NKS002UX

For charging system testing, use Starting/Charging System Tester (J-44373). For details and operating instructions, refer to Technical Service Bulletin.



*1 SC-25, "Check “L” Terminal Circuit (Open)"
*2 SC-25, "Check “L” Terminal Circuit (Short)"
*3 SC-25, "Check “S” Terminal Circuit"
*4 SC-26, "Check “B” Terminal Circuit"
*5 SC-28, "Alternator Pulley Inspection" (VK45DE)
SC-29, "Alternator Pulley Inspection" (VQ35DE)

PRELIMINARY INSPECTION

1. CHECK BATTERY TERMINALS CONNECTION

Check if battery terminals are clean and tight.

OK or NG

OK >> GO TO 2.
NG >> Repair battery terminals connection.

2. CHECK FUSE AND FUSIBLE LINK

Check for blown alternator and combination meter fuses.

Unit	Power source (Power supply terminals)	Fuse No.
Alternator	Battery (“S” terminal)	33
Combination meter	Ignition switch ON (“L” terminal)	14

OK or NG

OK >> GO TO 3.
NG >> If fuse is blown, be sure 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-174, "Checking Drive Belts" (VK45DE) or EM-15, "Checking Drive Belts" (VQ35DE).

OK or NG

OK >> INSPECTION END
NG >> Repair as needed.

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.

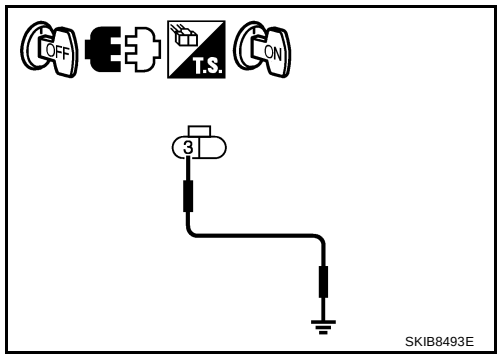
OK or NG

OK >> GO TO 2.
NG >> Repair “L” terminal connection. Confirm repair by performing complete Starting/Charging system test. Refer to Technical Service Bulletin.

2. CHECK “L” TERMINAL CIRCUIT (OPEN)

1. Disconnect alternator connector.
2. Apply ground to alternator harness connector E311 (VK45DE) or F26 (VQ35DE) terminal 3 with the ignition switch in the ON position.

3 – Ground : Charge warning lamp should light up.



OK or NG

OK >> Go to SC-23, "Trouble Diagnosis with Starting/Charging System Tester (Charging)" .
NG >> Check the following.

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

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 warning 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-23, "Trouble Diagnosis with Starting/Charging System Tester (Charging)" .

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.

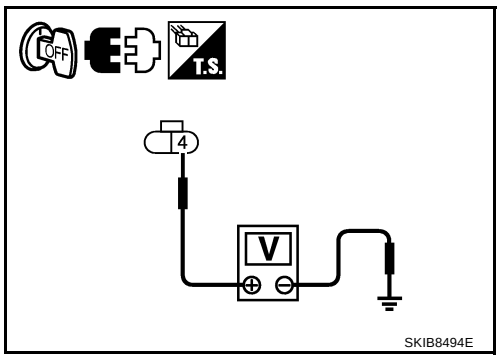
OK or NG

OK >> GO TO 2.
NG >> Repair “S” terminal connection. Confirm repair by performing complete Starting/Charging system test. Refer to Technical Service Bulletin.

2. CHECK ALTERNATOR “S” TERMINAL CIRCUIT

1. Disconnect alternator connector.
2. Check voltage between alternator harness connector E311 (VK45DE) or F26 (VQ35DE) terminal 4 and ground.

4 – Ground : Battery voltage



OK or NG

OK >> Go to SC-23, "Trouble Diagnosis with Starting/Charging System Tester (Charging)" .

NG >> Harness for open between alternator and fuse.

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

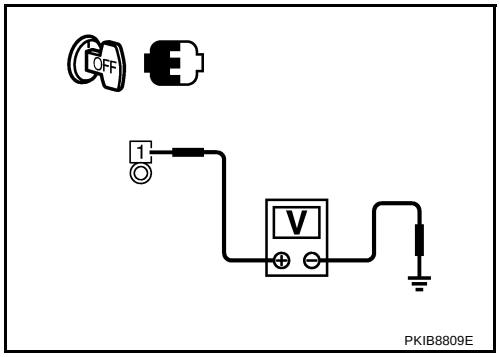
OK >> GO TO 2.

NG >> Repair “B” terminal connection. Confirm repair by performing complete Starting/Charging system test. Refer to Technical Service Bulletin.

2. CHECK ALTERNATOR “B” TERMINAL CIRCUIT

Check voltage between alternator “B” terminal E307 terminal 1 and ground.

1 – Ground : Battery voltage



OK or NG

OK >> GO TO 3.

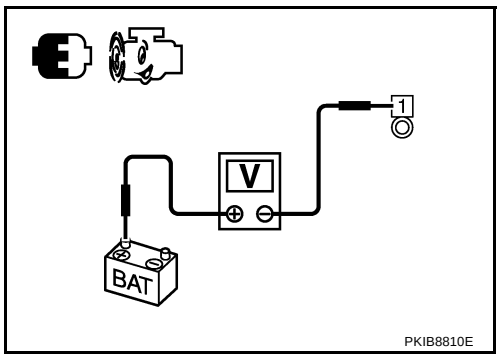
NG >> Check the following.

- Harness for open between alternator and fusible link (VK45DE and VQ35DE AWD)
- Harness for open between alternator and battery (VQ35DE 2WD)

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 E307 terminal 1 and battery positive terminal.

1 – Battery positive terminal : Less than 0.2 V



OK or NG

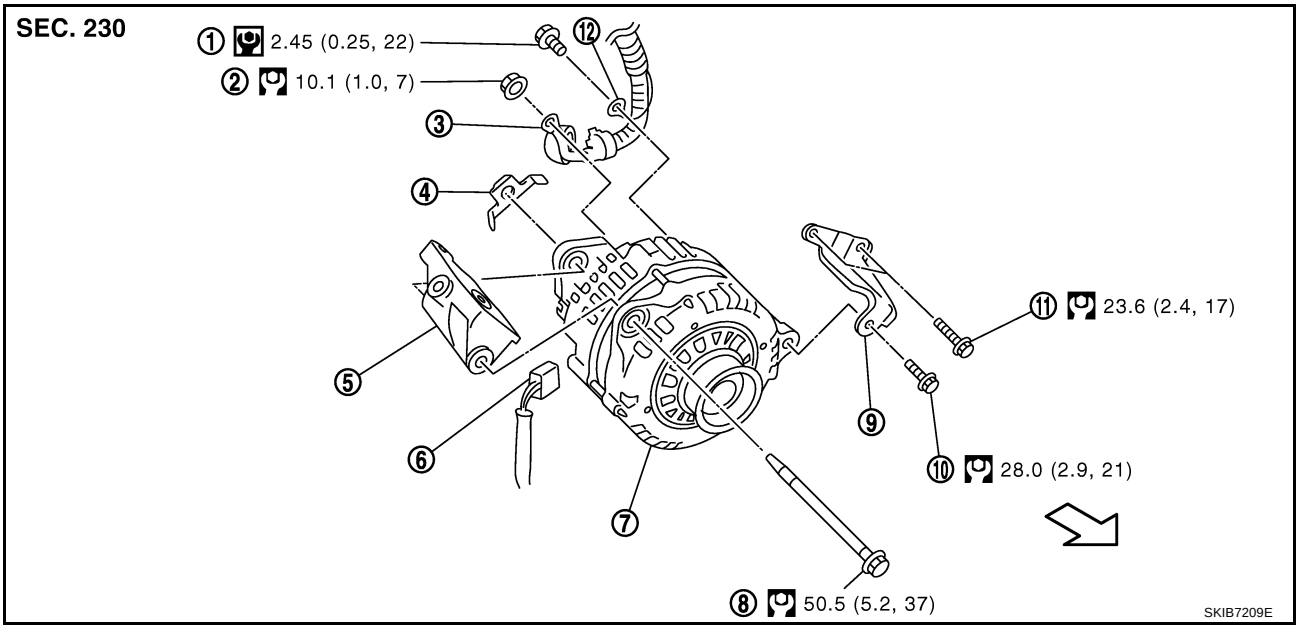
OK >> Go to SC-23, "Trouble Diagnosis with Starting/Charging System Tester (Charging)" .

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

Removal and Installation

NKS002UY

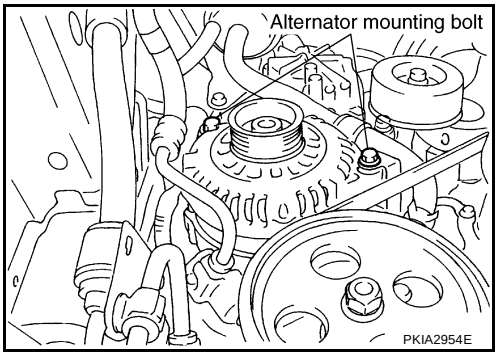
VK45DE ENGINE MODELS



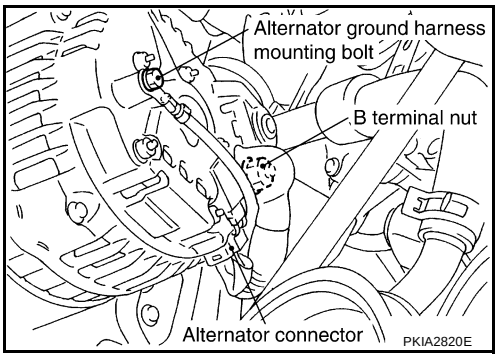
1. Alternator ground harness mounting bolt	2. B terminal nut	3. B terminal harness
4. Alternator Nut	5. Alternator bracket	6. Alternator connector
7. Alternator	8. Alternator mounting bolt	9. Alternator stay
10. Alternator mounting bolt	11. Alternator stay mounting bolt	12. Alternator ground harness
: N·m (kg-m, in-lb)	: N·m (kg-m, ft-lb)	: Engine front

Removal

1. Disconnect the battery cable from the negative terminal.
2. Remove engine front undercover, using power tools.
3. Remove radiator shroud (lower). Refer to CO-41, "RADIATOR" .
4. Remove alternator, water pump and A/C compressor belt. Refer to EM-174, "Removal and Installation" .
5. Remove alternator mounting bolts, using power tools.



6. Disconnect alternator connector.
7. Remove “B” terminal nut.
8. Remove alternator ground harness mounting bolt.
9. Remove alternator assembly downward from the vehicle.



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:

: 73.5 N·m (7.5 kg-m, 54 ft-lb)

Installation

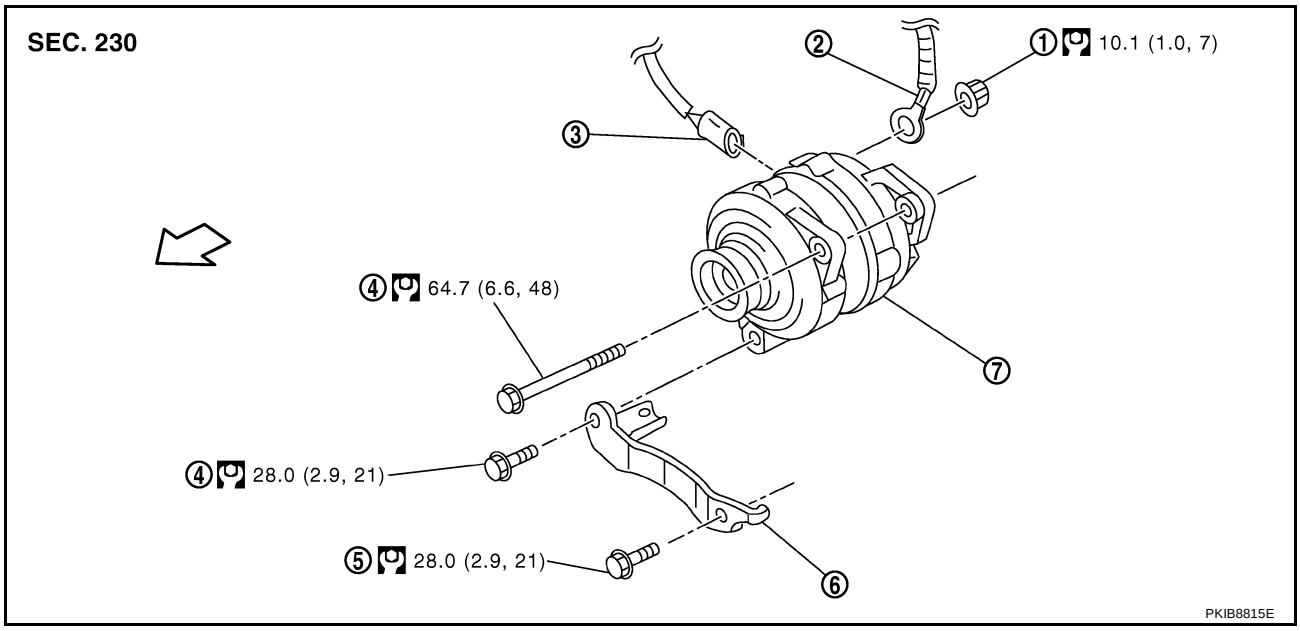
Installation is the reverse order of removal.

- Install alternator, and check tension of belt. Refer to EM-174, "Checking Drive Belts" .

CAUTION:

Be sure to tighten “B” terminal nut carefully.

VQ35DE ENGINE MODELS



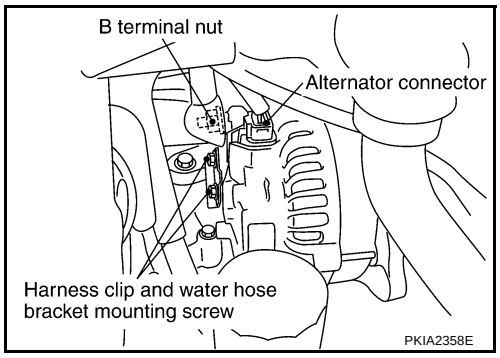
1. B terminal nut
2. B terminal harness
3. Alternator connector
4. Alternator mounting bolt
5. Alternator stay mounting bolt
6. Alternator stay
7. Alternator

: N·m (kg-m, ft-lb)

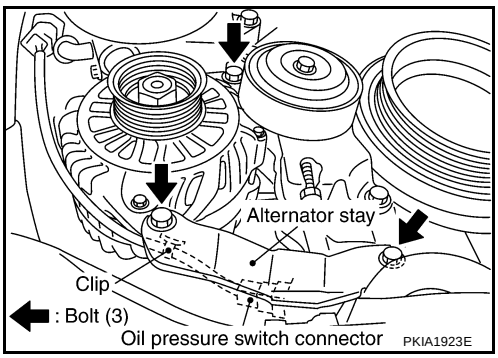
⇦ : Engine front

Removal

1. Disconnect the battery cable from the negative terminal.
2. Remove engine front undercover, using power tools.
3. Remove alternator and power steering oil pump belt. Refer to EM-16, "Removal and Installation" .
4. Disconnect alternator connector.
5. Remove “B” terminal nut.
6. Remove harness clip and water hose bracket from alternator.



7. Remove oil pressure switch harness clip from alternator stay. (2WD)
8. Disconnect oil pressure switch connector. (2WD)
9. Remove alternator stay mounting bolts and alternator stay, using power tools.
10. Remove alternator mounting bolt, using power tools.
11. Remove alternator assembly downward from the vehicle.



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.

- Install alternator, and check tension of belt. Refer to EM-15, "Checking Drive Belts" .

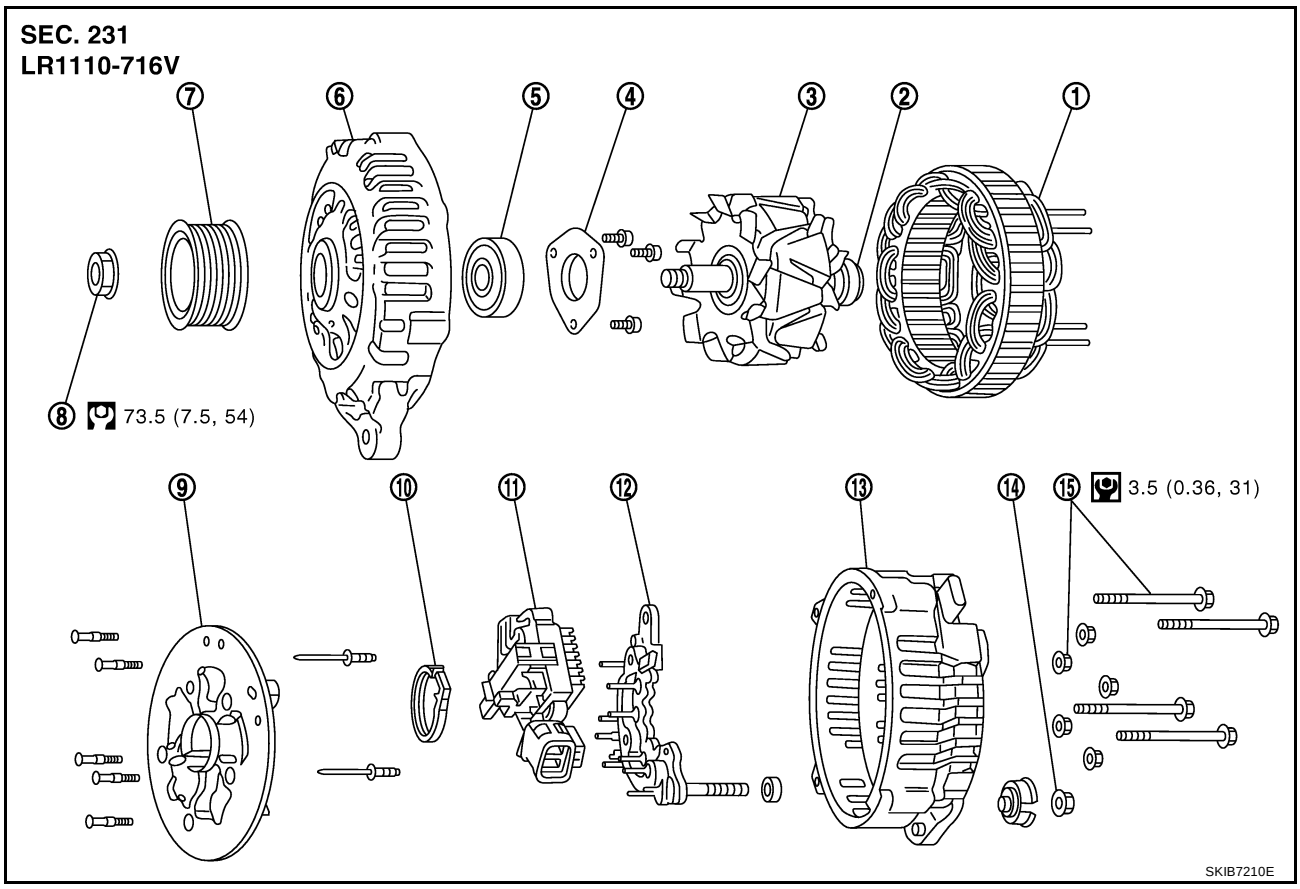
CAUTION:

Be sure to tighten “B” terminal nut carefully.

Disassembly and Assembly

NKS002UZ

VK45DE ENGINE MODELS



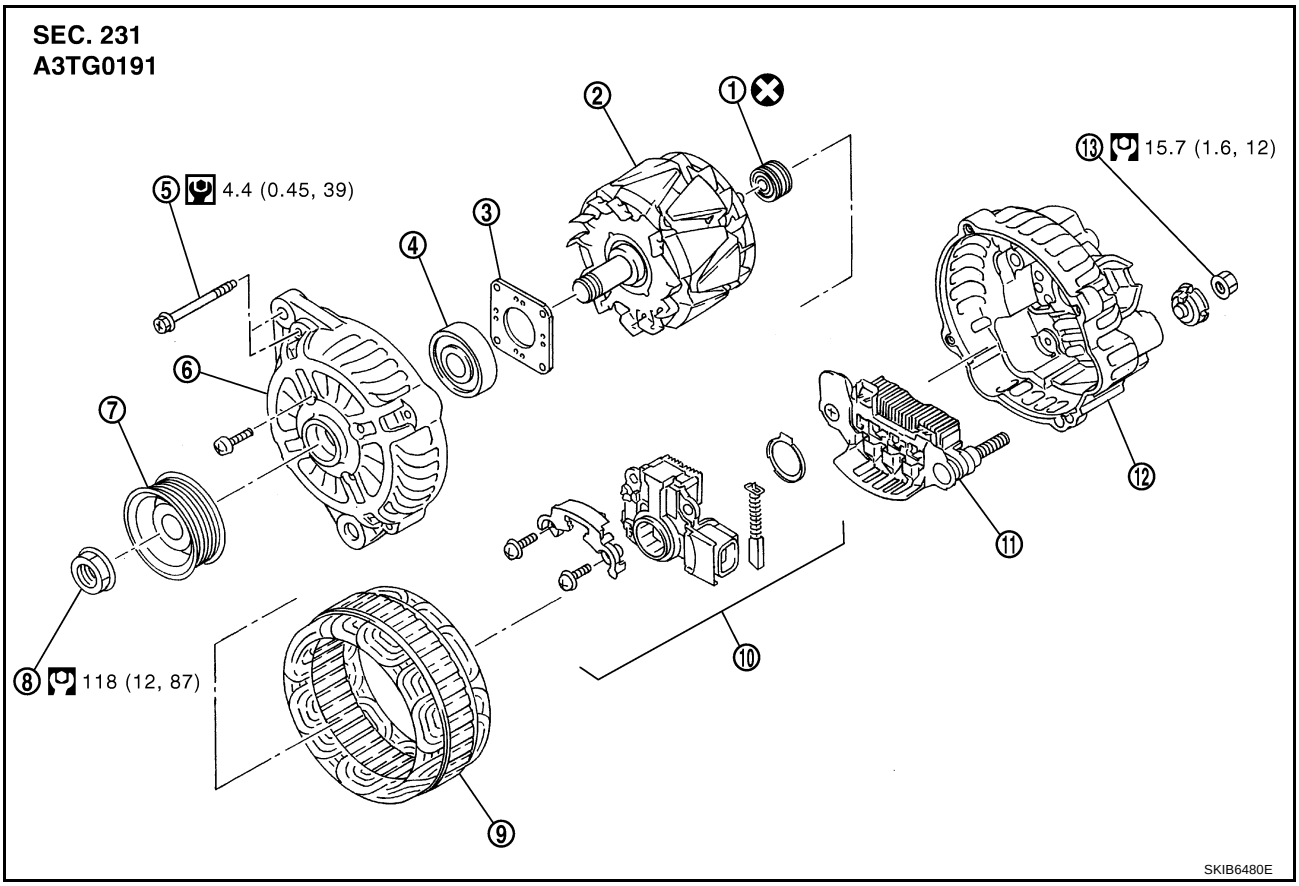
1. Stator assembly
2. Slip ring
3. Rotor assembly
4. Retainer
5. Front bearing
6. Front bracket assembly
7. Pulley
8. Pulley nut
9. Fun guide
10. Double labyrinth seal
11. IC voltage regulator assembly
12. Diode assembly
13. Rear bracket assembly
14. B terminal nut
15. Through-bolt and nut

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

VQ35DE ENGINE MODELS

SEC. 231
A3TG0191



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

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Battery

NKS002V0

Type		110D26L
Capacity	V - AH	12 - 64
Cold cranking current (For reference value)	A	720

Starter

NKS002V1

Applied model			VK45DE	VQ35DE (2WD)	VQ35DE (AWD)
Type			M2T85075	S114-880	S114-881
			MITSUBISHI make	HITACHI make	
			Reduction gear type		
System voltage		V	12		
No-load	Terminal voltage	V	11		
	Current	A	Less than 145	Less than 90	
	Revolution	rpm	More than 3,300	More than 2,880	
Minimum diameter of commutator		mm (in)	31.4 (1.236)	28.0 (1.102)	
Minimum length of brush		mm (in)	11.0 (0.433)	10.5 (0.413)	
Brush spring tension		N (kg, lb)	26.7 - 36.1 (2.72 - 3.68, 6.80 - 8.12)	16.2 (1.65, 3.6)	
Clearance between bearing metal and armature shaft		mm (in)	Less than 0.2 (0.008)		
Clearance between pinion front edge and pinion stopper		mm (in)	0.5 - 2.0 (0.020 - 0.079)	0.3 - 2.5 (0.012 - 0.098)	

Alternator

NKS002V2

Applied model		VK45DE	VQ35DE
Type		LR1110 - 716V	A3TG0191
		HITACHI make	MITSUBISHI make
Nominal rating	V - A	12 - 110	
Ground polarity		Negative	
Minimum revolution under no-load (When 13.5 V is applied)	rpm	Less than 1,100	Less than 1,000
Hot output current (When 13.5 V is applied)	A/rpm	More than 70/1,800 More than 91/2,500 More than 110/5,000	More than 37/1,300 More than 92/2,500 More than 103/5,000
Regulated output voltage	V	14.1 - 14.7	
Minimum length of brush	mm (in)	More than 6.00 (0.236)	More than 5.00 (0.197)
Brush spring pressure	N (g, oz)	1.00 - 3.43 (102 - 350, 3.60 - 12.34)	4.8 - 6.0 (490 - 612, 17.28 - 21.60)
Slip ring minimum outer diameter	mm (in)	More than 26.0 (1.024)	More than 22.1 (0.870)
Rotor (Field coil) resistance	Ω	2.31	1.7 - 2.1