

STARTING & CHARGING SYSTEM

SECTION SC

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GI

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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"

NCSC0001

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

In addition to the supplemental air bag modules for a frontal collision, the supplemental side air bag used along with the seat belt helps to reduce the risk or severity of injury to the driver and front passenger in a side collision. The supplemental side air bag consists of air bag modules (located in the outer side of front seats), satellite sensor, diagnosis sensor unit (which is one of components of supplemental air bags for a frontal collision), wiring harness, warning lamp (which is one of components of supplemental air bags for a frontal collision). 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 must be performed by an authorized INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses (except "SEAT BELT PRE-TENSIONER" connector) can be identified with yellow harness connector (and with yellow harness protector or yellow insulation tape before the harness connectors).

Wiring Diagrams and Trouble Diagnosis

NCSC0002

When you read wiring diagrams, refer to the followings:

- "HOW TO READ WIRING DIAGRAMS" in GI section
- "POWER SUPPLY ROUTING" for power distribution circuit in EL section

When you perform trouble diagnosis, refer to the followings:

- "HOW TO FOLLOW TEST GROUP IN TROUBLE DIAGNOSIS" in GI section
- "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT" in GI section

BATTERY

How to Handle Battery

How to Handle Battery

NCSC0003

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.

GI

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METHODS OF PREVENTING OVER-DISCHARGE

NCSC0003S01

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".

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- 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.)

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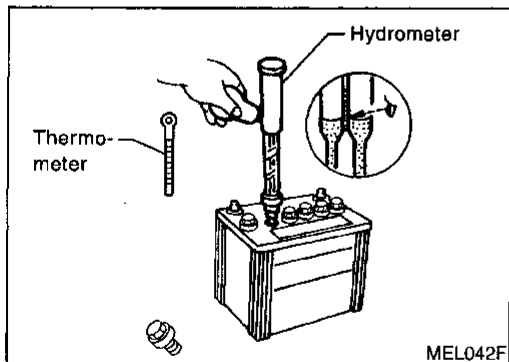
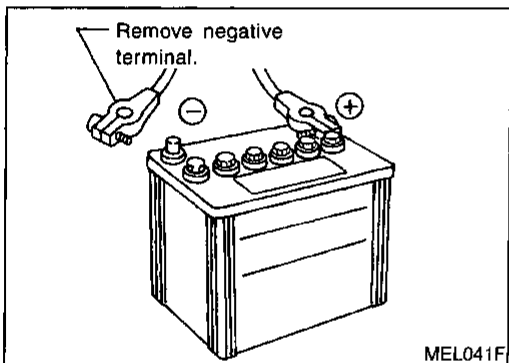
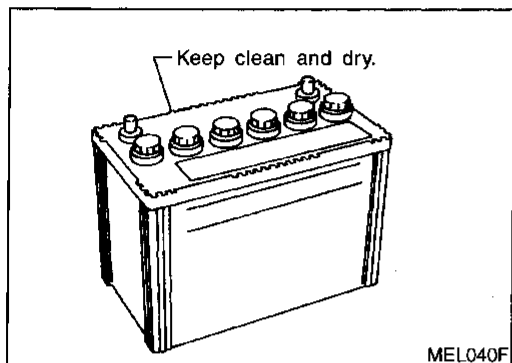
- Check the charge condition of the battery. Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.

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CHECKING ELECTROLYTE LEVEL

NCSC0003S02

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.

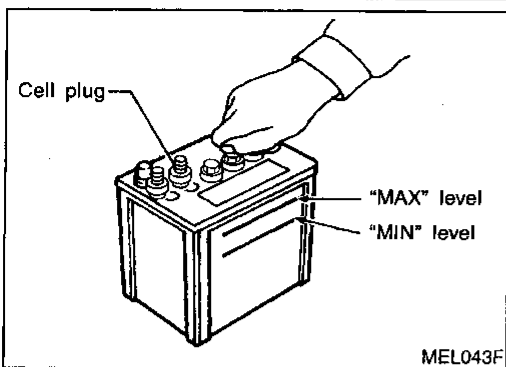
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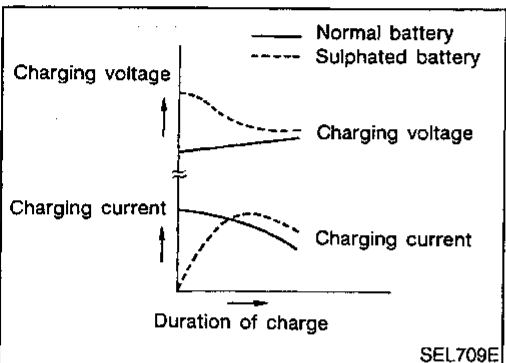
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BATTERY

How to Handle Battery (Cont'd)



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



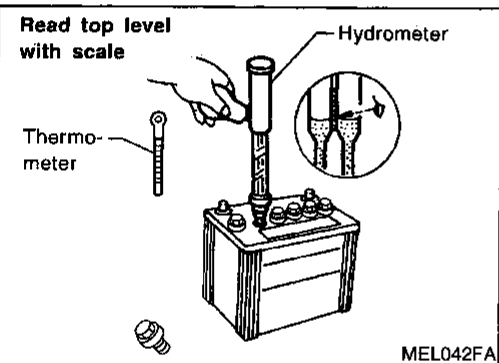
Sulphation

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.

NCSC0003S0201



SPECIFIC GRAVITY CHECK

1. Read hydrometer and thermometer indications at eye level.

NCSC0003S03

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

Hydrometer Temperature Correction

NCSC0003S0301

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

BATTERY

How to Handle Battery (Cont'd)

Battery electrolyte temperature °C (°F)	Add to specific gravity reading	
4 (40)	-0.016	GI
-1 (30)	-0.020	
-7 (20)	-0.024	MA
-12 (10)	-0.028	
-18 (0)	-0.032	EM

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

CHARGING THE BATTERY

NCSC0003S04

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

NCSC0003S0401

Amps	Time	
50	1 hour	ST
25	2 hours	
10	5 hours	RS
5	10 hours	BT

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.

STARTING SYSTEM

System Description

System Description

NCSC0004

NCSC0004S01

M/T MODELS

Power is supplied at all times

- to ignition switch terminal 1
- through 40A fusible link (letter **g**, located in the fuse and fusible link box).

With the ignition switch in the START position, power is supplied through 10A fuse [No. 26, located in the fuse block (J/B)]

- to theft warning relay terminal 3.

Also, with the ignition switch in the START position, power is supplied

- from ignition switch terminal 5
- to clutch interlock relay terminal 3.

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

- to theft warning relay terminal 1
- through 10A fuse [No. 16, located in the fuse block (J/B)]

If the theft warning system is triggered, ground is supplied

- through smart entrance control unit terminal 3
- to theft warning relay terminal 2.

Then power to the clutch interlock relay is interrupted.

If the theft warning system is not triggered, power is supplied

- through theft warning relay terminal 4
- to clutch interlock relay terminal 1.

When the clutch pedal is depressed, ground is supplied

- to clutch interlock relay terminal 2 through the clutch interlock switch
- from body grounds M15, M71 and M76.

Then clutch interlock relay is energized and power is supplied

- from clutch interlock relay terminal 5
- to starter motor harness connector terminal 2.

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.

A/T MODELS

NCSC0004S02

Power is supplied at all times

- to ignition switch terminal 1
- through 40A fusible link (letter **g**, located in the fuse and fusible link box).

With the ignition switch in the ON or START position, power is supplied through 10A fuse [No. 16, located in the fuse block (J/B)]

- to theft warning relay terminals 1 and 3.

Also, with the ignition switch in the START position, power is supplied

- from ignition switch terminal 5
- to park/neutral position relay terminal 6.

If the theft warning system is triggered, ground is supplied

- through smart entrance control unit terminal 3
- to theft warning relay terminal 2.

If the theft warning system is not triggered, power is supplied

- through theft warning relay terminal 4
- to park/neutral position relay terminal 1.

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

- to park/neutral position relay terminal 2 through the park/neutral position switch
- from body grounds, E28 and E9.

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

- from park/neutral position relay terminal 7

STARTING SYSTEM

System Description (Cont'd)

- to starter motor harness connector terminal 2.

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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STARTING SYSTEM

Wiring Diagram — START —

Wiring Diagram — START —

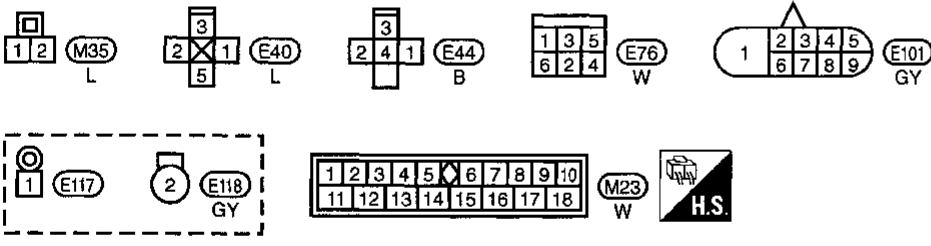
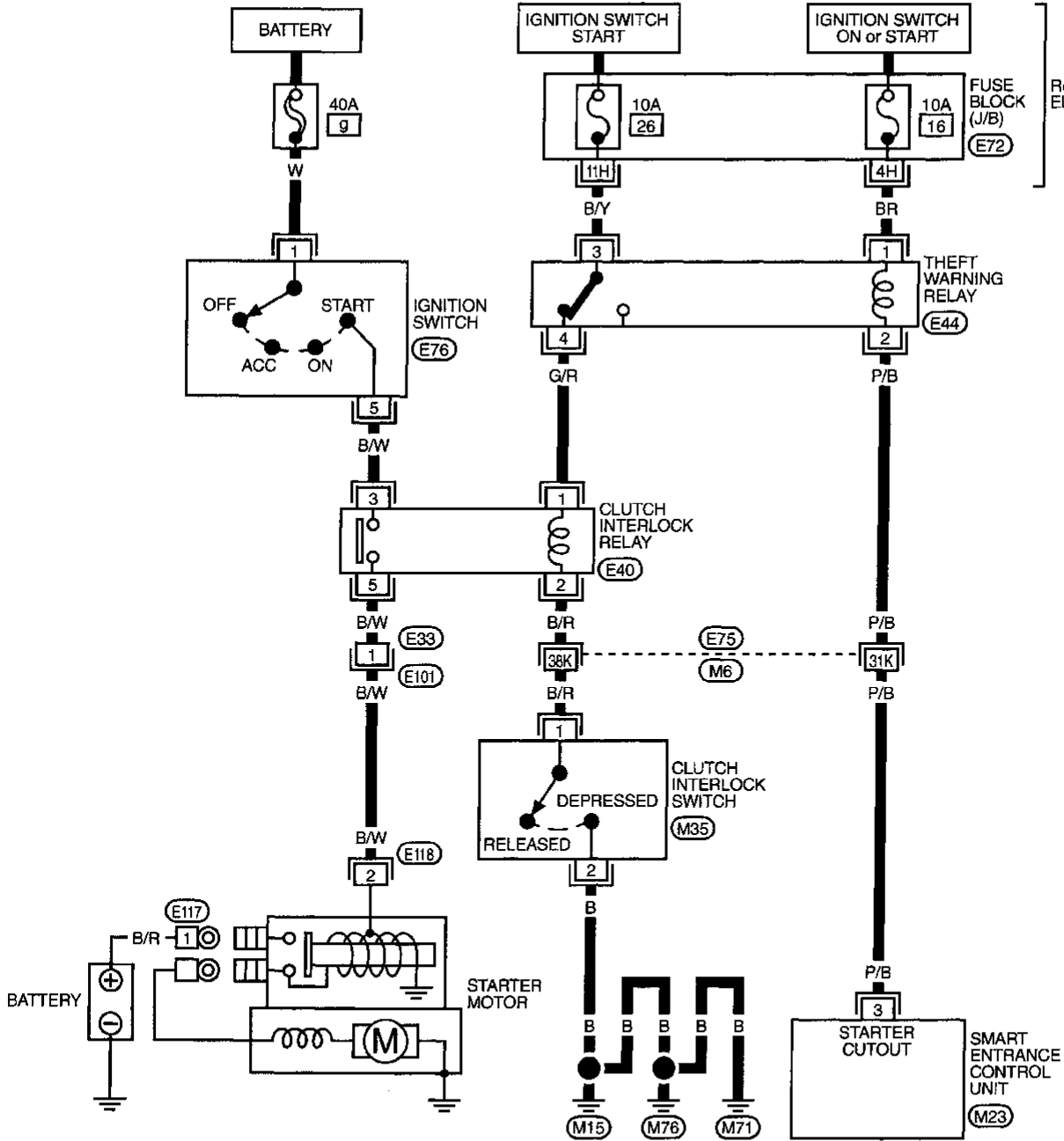
M/T MODELS

NCSC0005

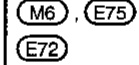
NCSC0005S01

SC-START-01

Refer to EL-POWER.



Refer to last page (Foldout page).



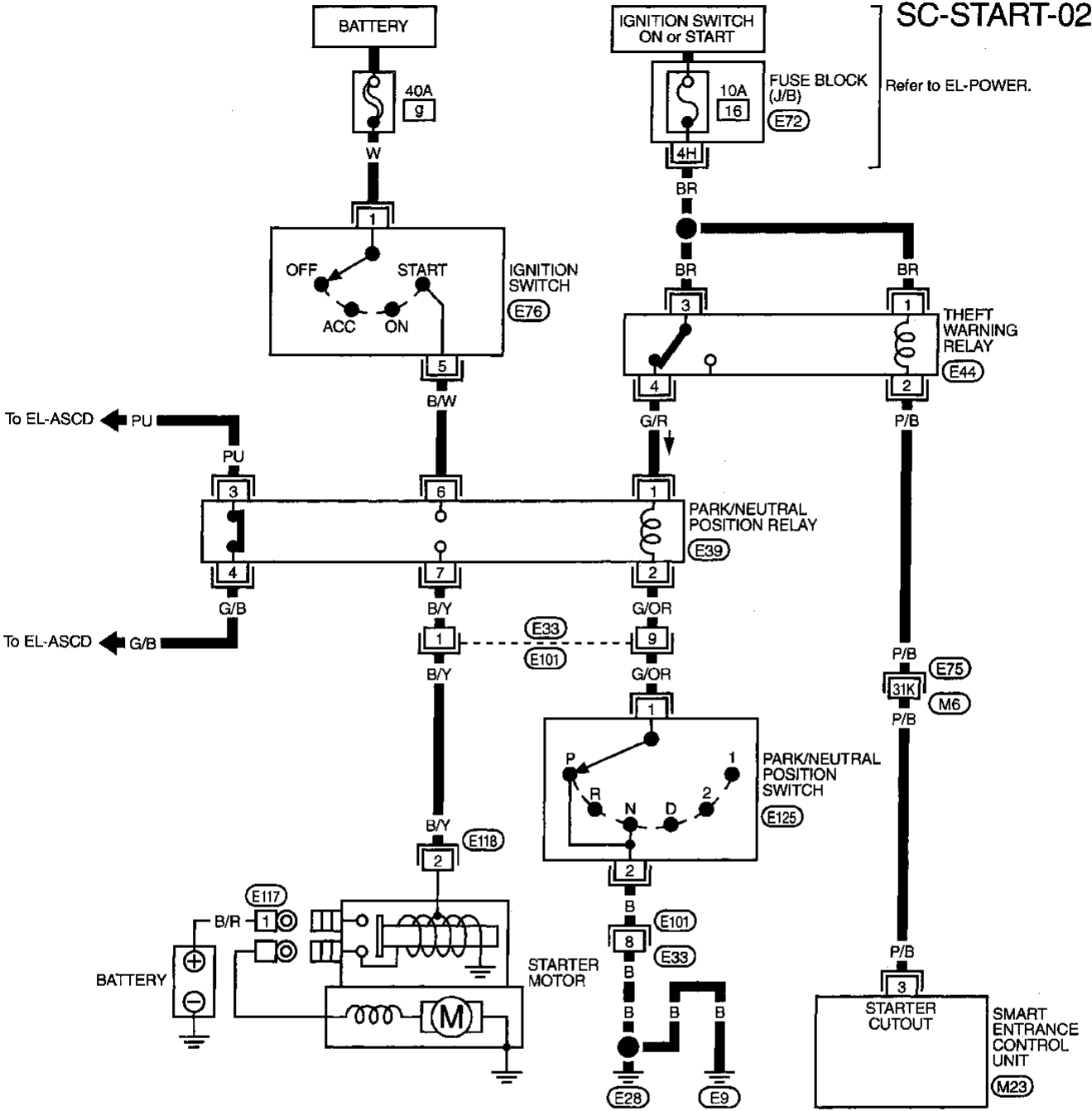
STARTING SYSTEM

Wiring Diagram — START — (Cont'd)

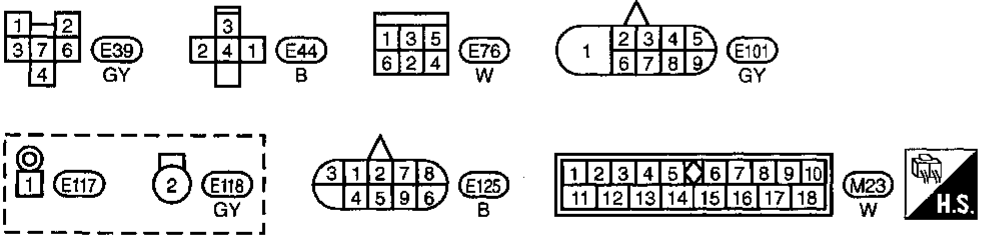
AT MODELS

NCSC0005S02

SC-START-02



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Refer to last page (Foldout page).

M6, E75, E72

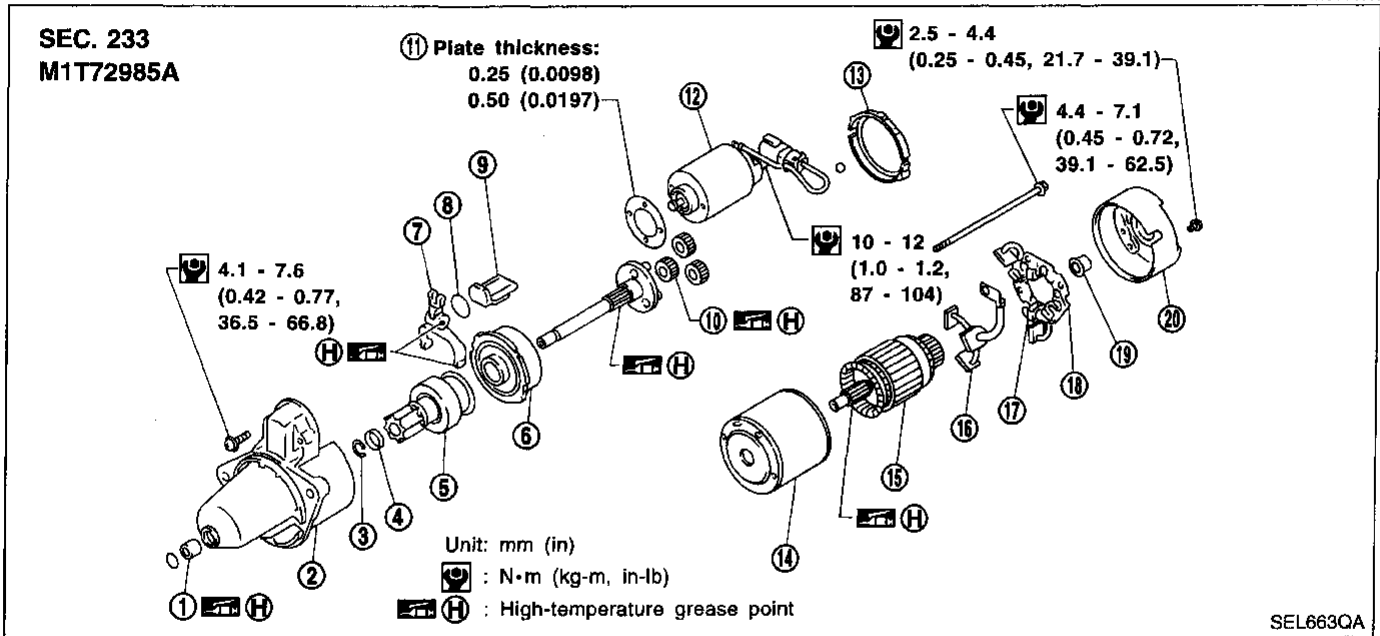
TSC002

STARTING SYSTEM

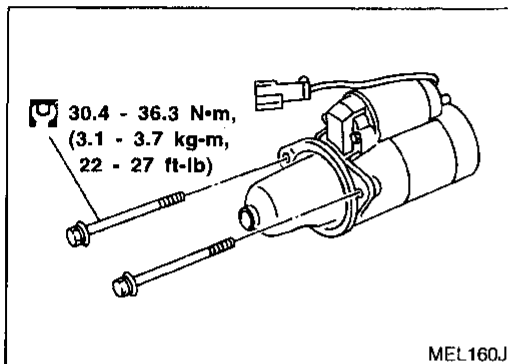
Construction

Construction

NCSC0006



- | | | |
|--------------------|------------------------------|------------------|
| 1. Sleeve bearing | 8. Plate | 15. Armature |
| 2. Gear case | 9. Packing | 16. Brush (+) |
| 3. Stopper clip | 10. Planetary gear | 17. Brush spring |
| 4. Pinion stopper | 11. Adjusting plate | 18. Brush holder |
| 5. Pinion assembly | 12. Magnetic switch assembly | 19. Bearing |
| 6. Internal gear | 13. Packing | 20. Rear cover |
| 7. Shift lever | 14. Yoke | |



Removal and Installation

NCSC0007

Pinion/Clutch Check

NCSC0008

- Inspect pinion teeth.
 - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
- Inspect reduction gear teeth.
 - Replace reduction gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)
- 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.

SC-10

CHARGING SYSTEM

System Description

System Description

NCSC0009

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.

GI

Power is supplied at all times to alternator terminal 4 (S) through:

- 100A fusible link (letter e, located in the fuse and fusible link box), and
- 7.5A fuse (No. 37, located in the fuse and fusible link box).

MA

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 4 (S) detecting the input voltage. The charging circuit is protected by the 100A fusible link.

EM

The alternator is grounded to the engine block.

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

LC

- through 10A fuse [No. 11, located in the fuse block (J/B)]
- to combination meter terminal 37 for the charge warning lamp.

EC

Ground is supplied to terminal 38 of the combination meter through terminal 3 (L) of the alternator. 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.

FE

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

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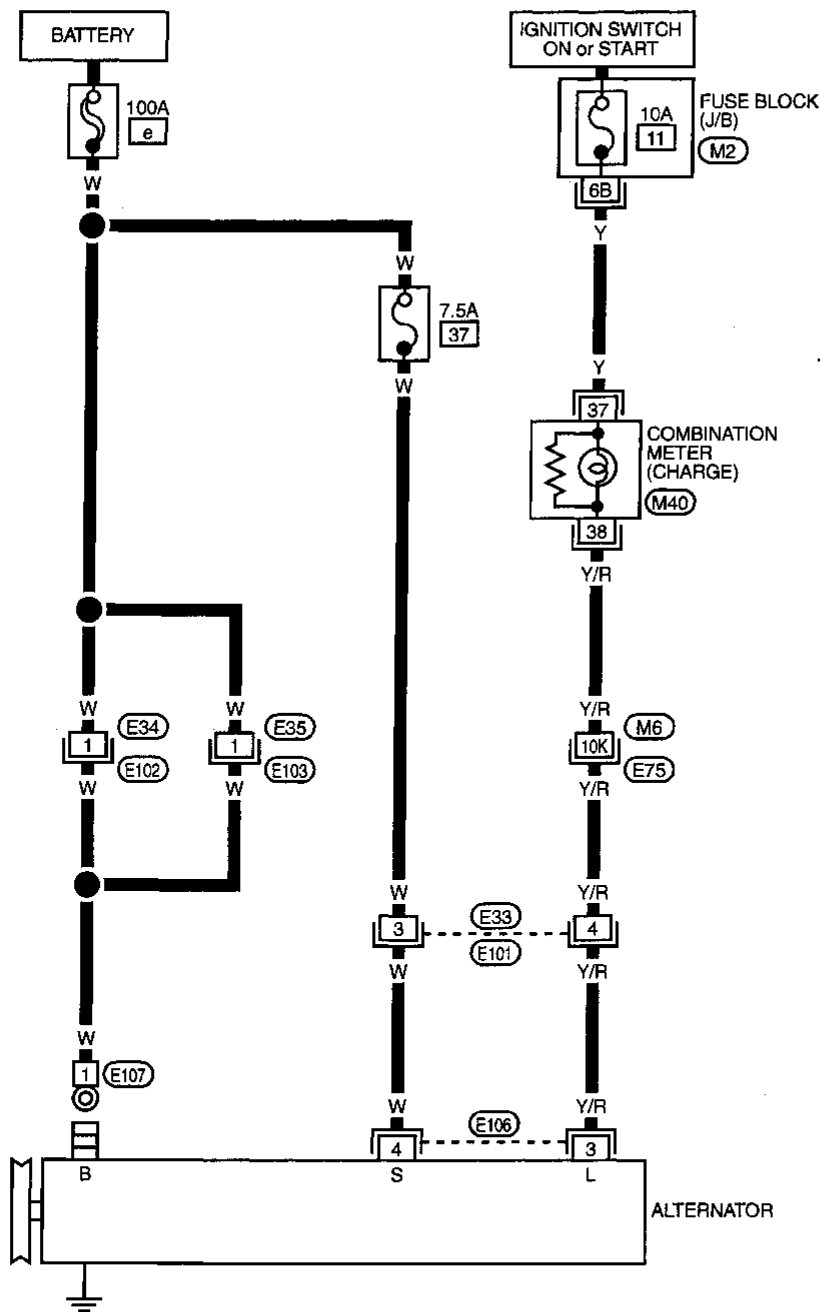
CHARGING SYSTEM

Wiring Diagram — CHARGE —

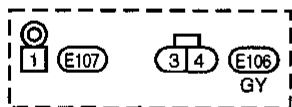
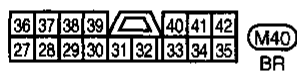
Wiring Diagram — CHARGE —

NCSC0010

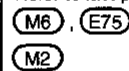
SC-CHARGE-01



Refer to EL-POWER.



Refer to last page (Foldout page).



Trouble Diagnoses

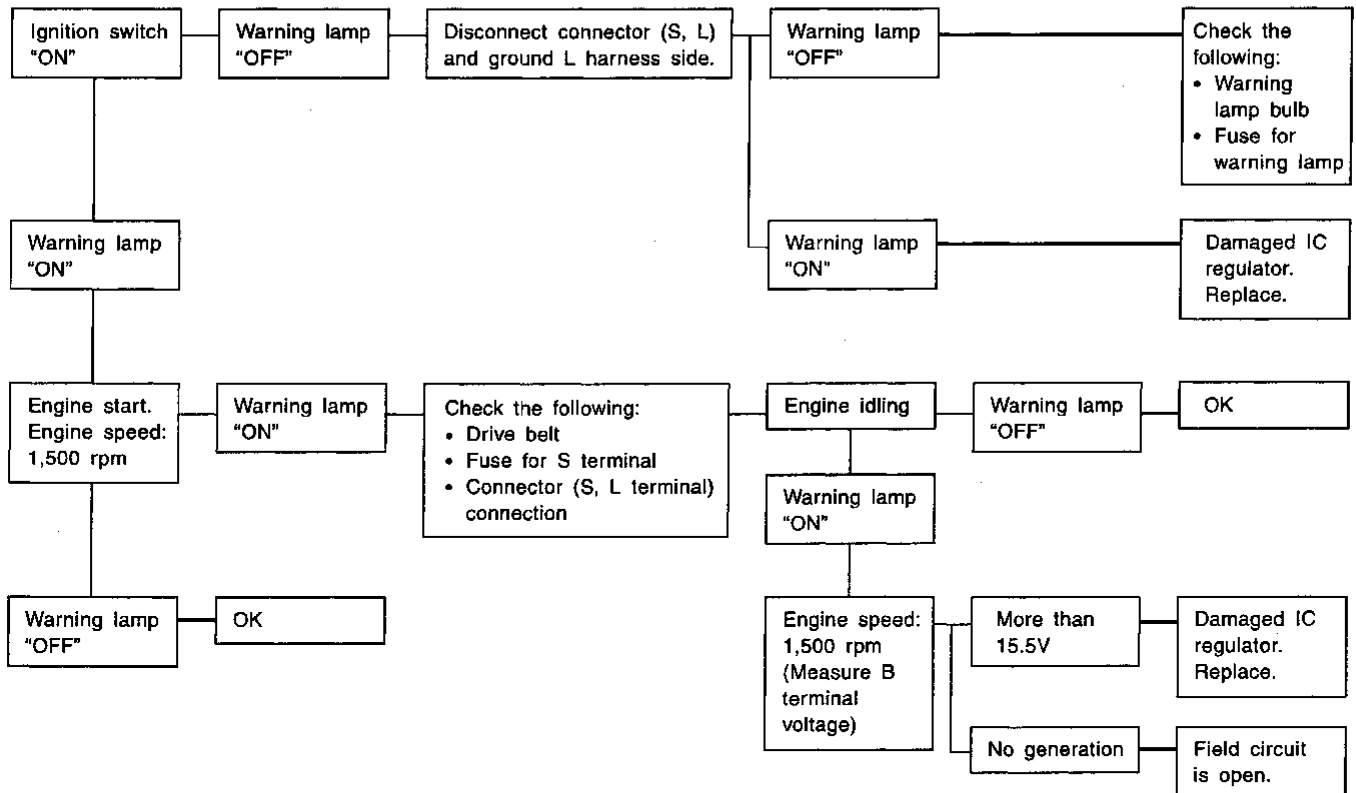
NCSC0011

Before conducting an alternator test, make sure that the battery is fully charged. A 30-volt voltmeter and suitable test probes are necessary for the test. The alternator can be checked easily by referring to the Inspection Table.

- Before starting, inspect the fusible link.
- Use fully charged battery.

WITH IC REGULATOR

NCSC0011S01



Warning lamp: "CHARGE" warning lamp in combination meter

SEL338V

NOTE:

- If the inspection result is OK even though the charging system is malfunctioning, check the B terminal connection. (Check the tightening torque.)
- When field circuit is open, check condition of rotor coil, rotor slip ring and brush. If necessary, replace faulty parts with new ones.

MALFUNCTION INDICATOR

NCSC0011S02

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

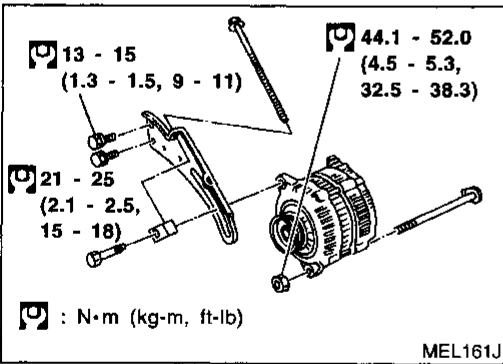
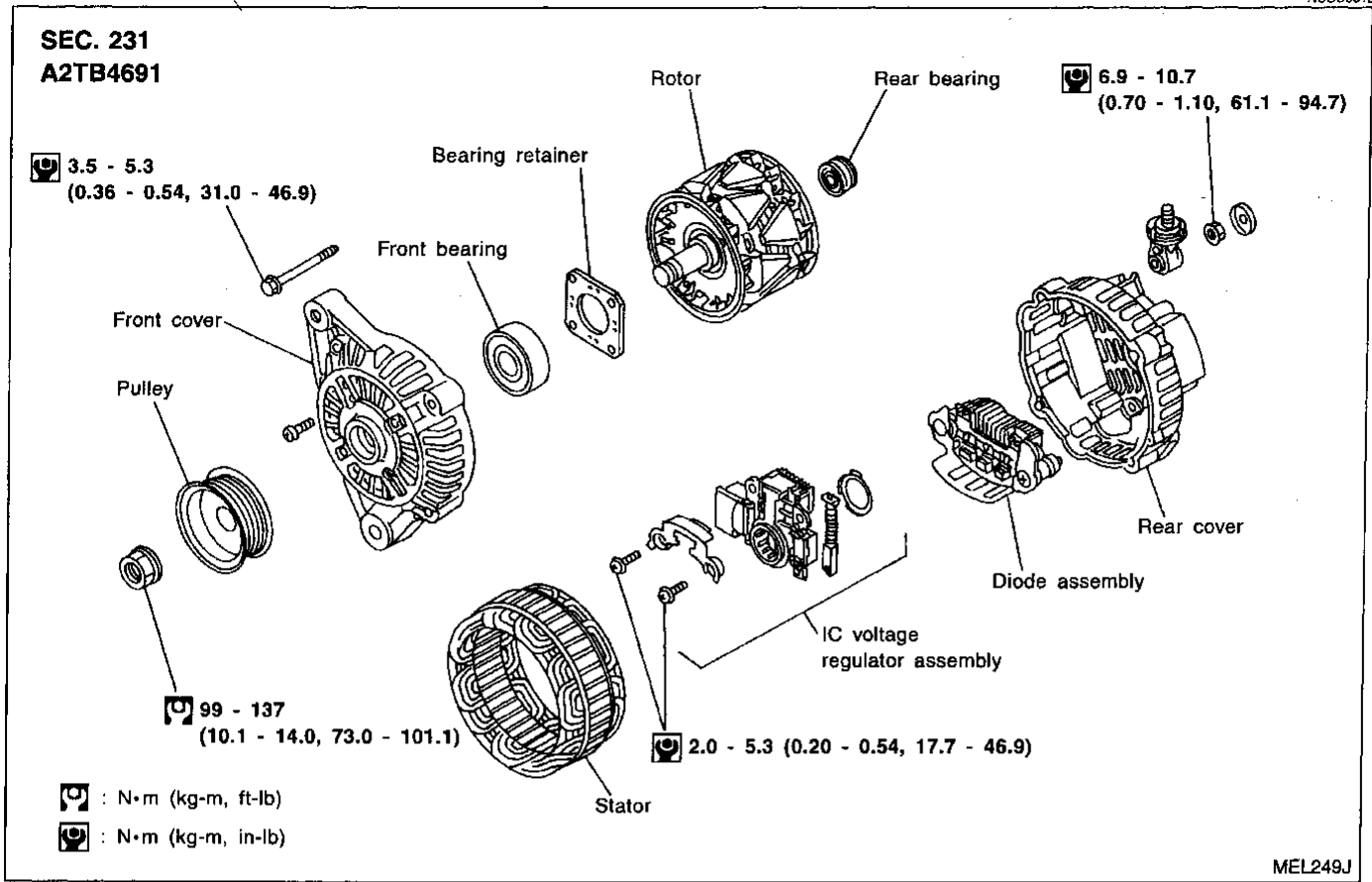
- Excessive voltage is produced.
- No voltage is produced.

CHARGING SYSTEM

Construction

Construction

NCSC0012



Removal and Installation

NCSC0013

SERVICE DATA AND SPECIFICATIONS (SDS)

Battery

Battery

NCSC0014

Type	80D26L	GI
Capacity V-AH	12-55	
Cold cranking current A (For reference value)	582	MA

Starter

NCSC0015

Type		M1T72985A	EM
		MITSUBISHI make	LC
		Reduction gear type	
System voltage		12V	EC
No-load	Terminal voltage	11.0V	
	Current	50 - 75A	FE
	Revolution	3,000 - 4,000 rpm	CL
Minimum diameter of commutator		28.8 mm (1.134 in)	
Minimum length of brush		12.0 mm (0.472 in)	
Brush spring tension		13.7 - 25.5 N (1.4 - 2.6 kg, 3.1 - 5.7 lb)	MT
Clearance between pinion front edge and pinion stopper		0.5 - 2.0 mm (0.020 - 0.079 in)	AT

Alternator

NCSC0016

Type		A2TB4691	AX
		MITSUBISHI make	
Nominal rating		12V-90A	SU
Ground polarity		Negative	
Minimum revolution under no-load (When 13.5 volts is applied)		Less than 1,300 rpm	BR
Hot output current (When 13.5 volts is applied)		More than 25A/1,300 rpm More than 67A/2,500 rpm	ST
Regulated output voltage		14.1 - 14.7V	
Minimum length of brush		5.0 mm (0.197 in)	RS
Brush spring pressure		4.8 - 6.0 N (490 - 610 g, 17.28 - 21.51 oz)	
Slip ring minimum outer diameter		22.1 mm (0.870 in)	BT
Rotor (Field coil) resistance		1.8 - 2.1Ω	

HA

SC

EL

IDX