

# STARTING & CHARGING SYSTEM

## SECTION SC

### CONTENTS

<b>PRECAUTIONS</b> .....	2	<b>REMOVAL</b> .....	9
Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" .....	2	<b>INSTALLATION</b> .....	9
Wiring Diagrams and Trouble Diagnosis.....	2	Pinion/Clutch Check .....	10
<b>BATTERY</b> .....	3	<b>CHARGING SYSTEM</b> .....	11
How to Handle Battery .....	3	System Description.....	11
METHODS OF PREVENTING OVER-DISCHARGE .....	3	Wiring Diagram - CHARGE - .....	12
CHECKING ELECTROLYTE LEVEL .....	3	Trouble Diagnoses.....	13
SPECIFIC GRAVITY CHECK .....	4	WITH IC REGULATOR.....	13
CHARGING THE BATTERY.....	5	MALFUNCTION INDICATOR .....	13
<b>STARTING SYSTEM</b> .....	6	Construction.....	14
System Description.....	6	Removal and Installation .....	14
M/T MODELS .....	6	REMOVAL.....	14
A/T MODELS.....	6	INSTALLATION.....	14
Wiring Diagram - START - .....	7	<b>SERVICE DATA AND SPECIFICATIONS (SDS)</b> .....	15
M/T MODELS .....	7	Battery.....	15
A/T MODELS.....	8	Starter .....	15
Construction.....	9	Alternator .....	15
Removal and Installation .....	9		

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

## PRECAUTIONS

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

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

NFSC0001

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL A33 is as follows (The composition varies according to optional equipment.):

- For a frontal collision  
The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision  
The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of 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 should be performed by an authorized NISSAN dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the RS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. Spiral cable and wiring harnesses covered by yellow insulation or tape either just before the harness connectors or for the complete harness are related to the SRS.**

### Wiring Diagrams and Trouble Diagnosis

NFSC0002

When you read wiring diagrams, refer to the following:

- GI-11, "HOW TO READ WIRING DIAGRAMS".
- EL-9, "POWER SUPPLY ROUTING" for power distribution circuit.

When you perform trouble diagnosis, refer to the following:

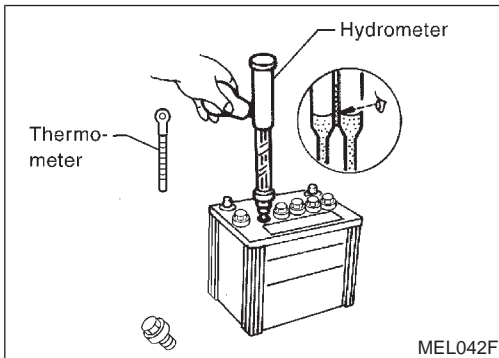
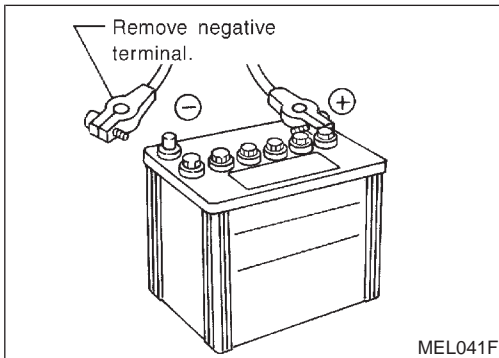
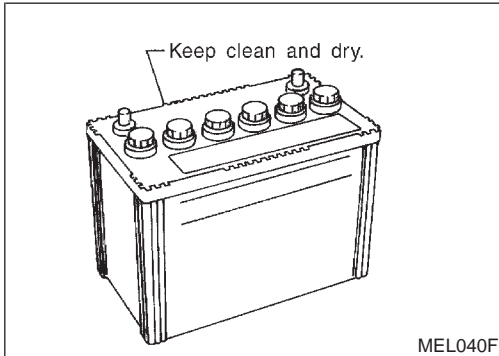
- GI-36, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES".
- GI-25, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT".

## How to Handle Battery

NFSC0003

### 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

NFSC0003S01

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

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

## CHECKING ELECTROLYTE LEVEL

NFSC0003S02

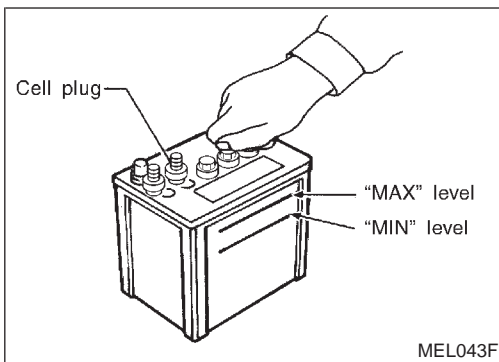
### WARNING:

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.

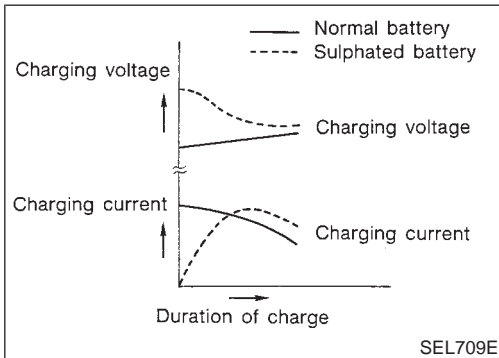
GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

# BATTERY

## How to Handle Battery (Cont'd)



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



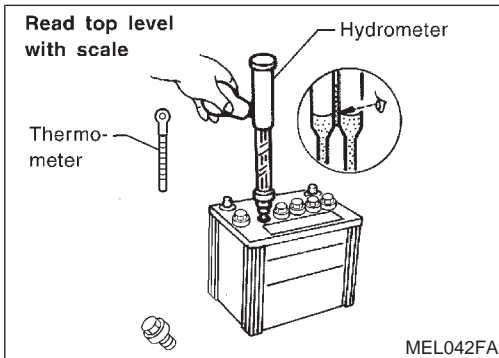
## Sulphation

NFSC0003S0201

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

NFSC0003S03

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

NFSC0003S0301

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

NFSC0003S04 MT

### CAUTION:

- Do not “quick charge” a fully discharged battery.
- Keep the battery away from open flame while it is being charged. AT
- 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. AX
- If battery electrolyte temperature rises above 60°C (140°F), stop charging. Always charge battery at a temperature below 60°C (140°F). SU

## Charging Rates

NFSC0003S0401 BR

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.

HA

SC

EL

IDX

# STARTING SYSTEM

System Description

## System Description

NFSC0004

NFSC0004S01

### M/T MODELS

Power is supplied at all times

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

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

- through terminal 5 of the ignition switch
- to clutch interlock relay terminal 5.

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

- through 10A fuse [No. 21, located in the fuse block (J/B)]
- 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 and body grounds E11, E22 and E53.

The clutch interlock relay is energized and power is supplied

- from terminal 3 of the clutch interlock relay
- to terminal 2 of the starter motor windings.

The starter motor plunger closes and provides a closed circuit between the battery and the starter motor. The starter motor is grounded to the cylinder block. With power and ground supplied, the starter motor operates.

### A/T MODELS

NFSC0004S02

Power is supplied at all times

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

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

- through 15A fuse [No. 20, located in the fuse block (J/B)]
- to park/neutral position relay terminal 1.

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

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

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

- to park/neutral position relay terminal 2
- through park/neutral position switch.

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

- from ignition switch terminal 5
- through park/neutral position relay terminals 6 and 7
- to terminal 2 of the starter motor windings.

The starter motor plunger closes and provides a closed circuit between the battery and the starter motor. The starter motor is grounded to the cylinder block. With power and ground supplied, the starter motor operates.

# STARTING SYSTEM

Wiring Diagram — START —

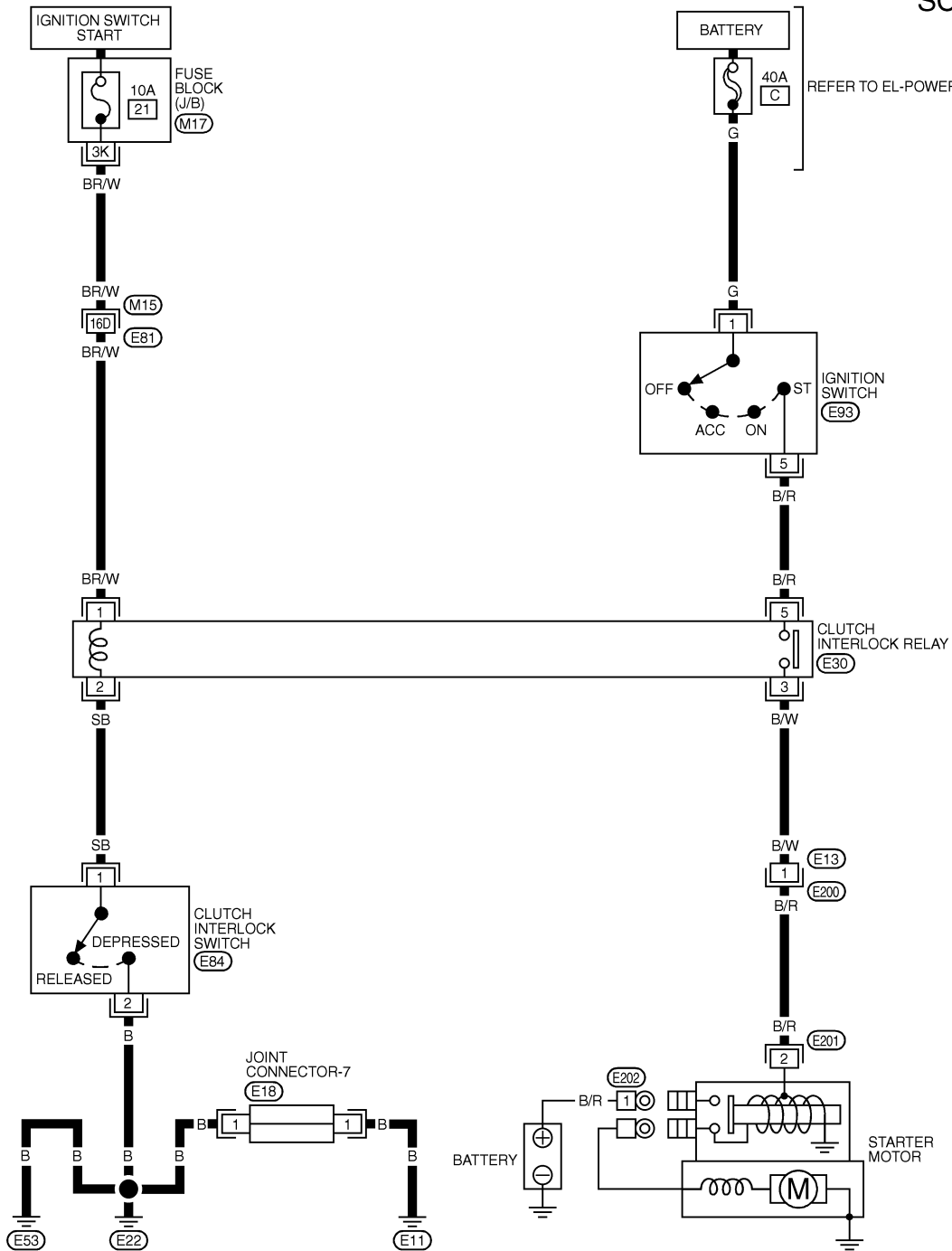
## Wiring Diagram — START —

NFSC0005

NFSC0005S01

M/T MODELS

SC-START-01

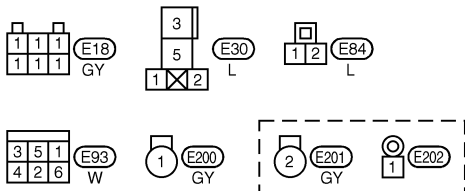


GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA

SC

EL

IDX



REFER TO THE FOLLOWING.  
(M15), (E81) -SUPER  
MULTIPLE JUNCTION(SMJ)  
(M17) - FUSE BLOCK-  
JUNCTION BOX(J/B)

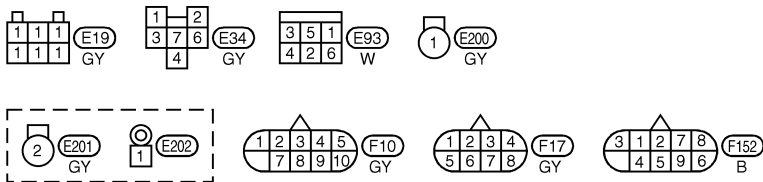
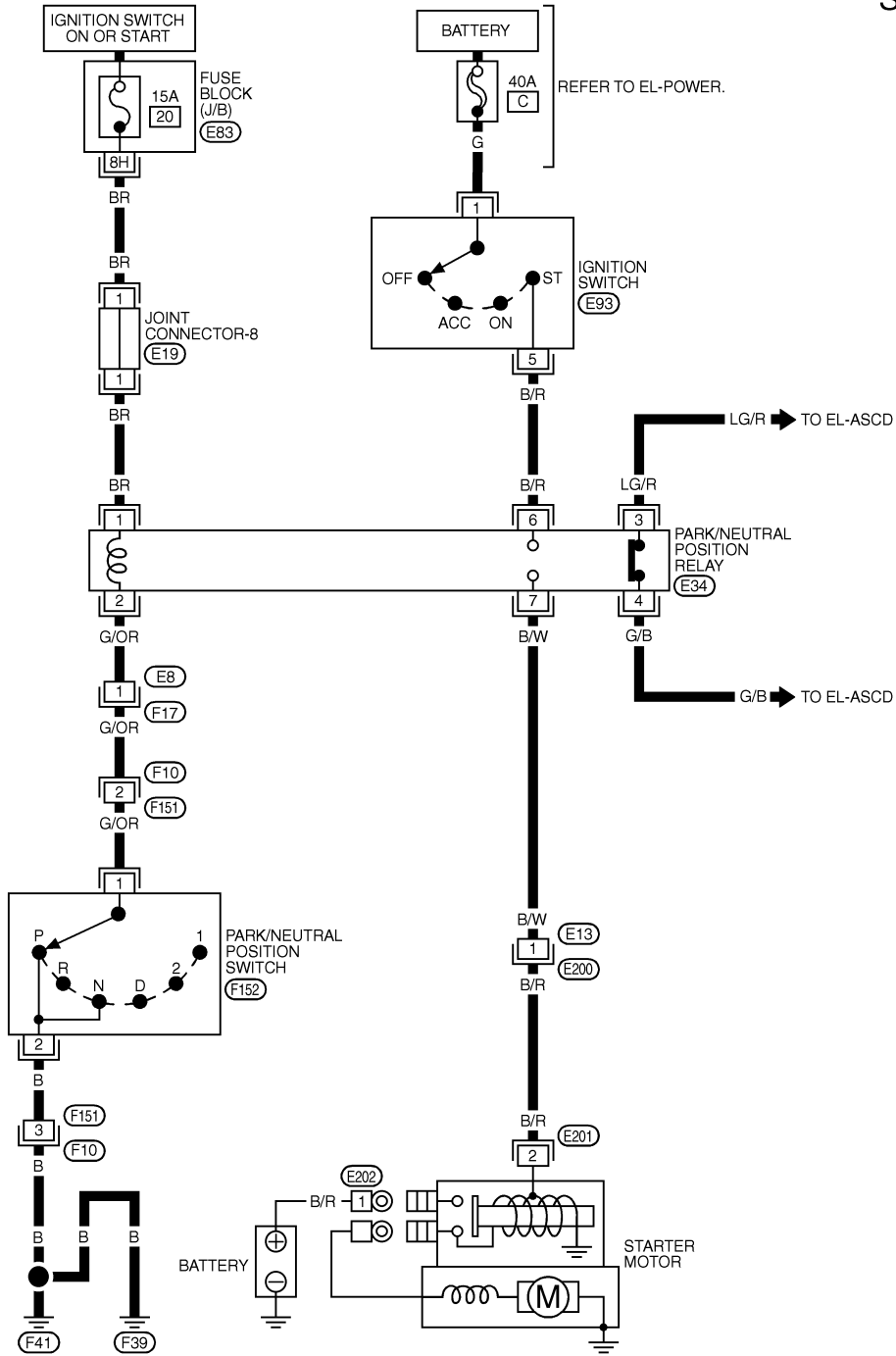
# STARTING SYSTEM

Wiring Diagram — START — (Cont'd)

A/T MODELS

NFSC0005S02

SC-START-02



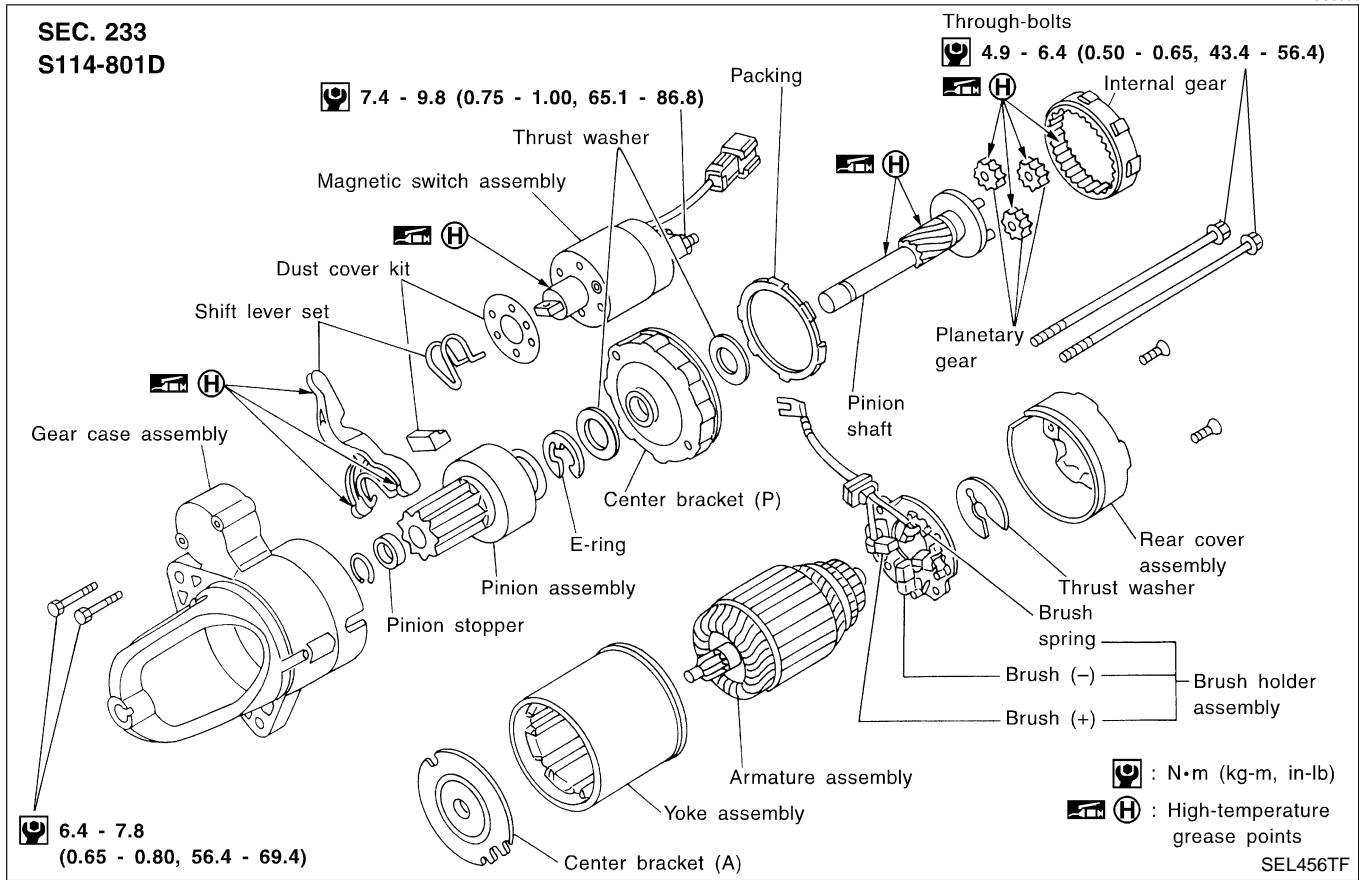
REFER TO THE FOLLOWING.  
 (E83) - FUSE BLOCK-  
 JUNCTION BOX (J/B)

MEL209K



## Construction

NFSC0006



GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX

SU

BR

ST

RS

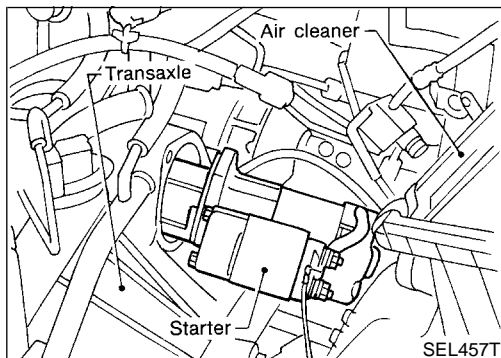
BT

HA

SC

EL

IDX



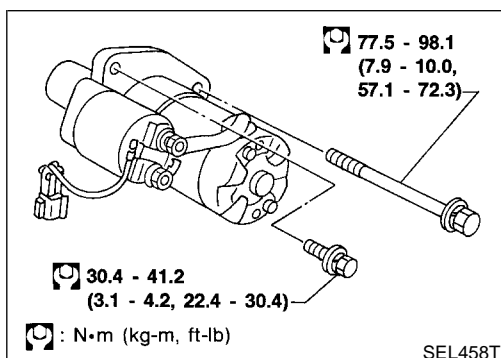
## Removal and Installation

### REMOVAL

1. Remove air duct assembly.
2. Remove harness protector from engine room harness.
3. Disconnect starter harness.
4. Remove starter bolts (two).
5. Remove starter.

NFSC0007

NFSC0007S01



### INSTALLATION

To install, reverse the removal procedure.

NFSC0007S02

# STARTING SYSTEM

## Pinion/Clutch Check

---

### Pinion/Clutch Check

NFSC0008

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.

## System Description

NFSC0009

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 to alternator terminal 3 (S) through:

- 120A fusible link (letter **a**, located in the fuse and fusible link box), and
- 10A fuse (No. 70, located in the fuse and fusible link box).

Terminal B supplies power to charge the battery and operate the vehicle's electrical system. Output voltage is controlled by the IC regulator at terminal 3 (S) detecting the input voltage. The charging circuit is protected by the 120A fusible link.

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. 30, located in the fuse block (J/B)]
- to combination meter terminal 66 for the charge warning lamp.

Ground is supplied to terminal 68 of the combination meter through terminal 2 (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.

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

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

**SC**

EL

IDX

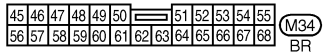
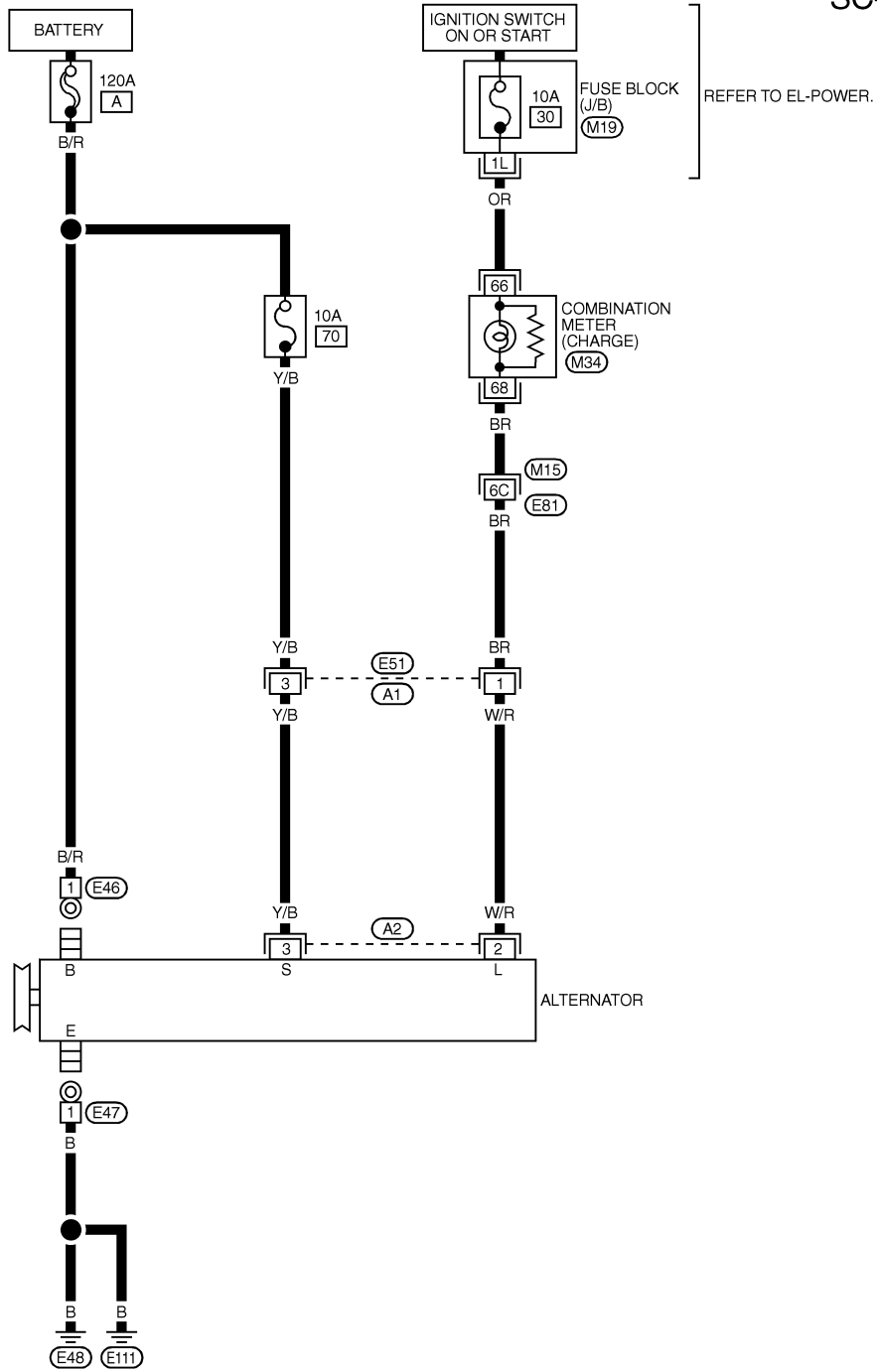
# CHARGING SYSTEM

Wiring Diagram — CHARGE —

## Wiring Diagram — CHARGE —

NFSC0010

### SC-CHARGE-01



REFER TO THE FOLLOWING.  
 (M15) , (E81) -SUPER  
 MULTIPLE JUNCTION(SMJ)  
 (M19) -FUSE BLOCK-  
 JUNCTION BOX(J/B)

MEL210K

## Trouble Diagnoses

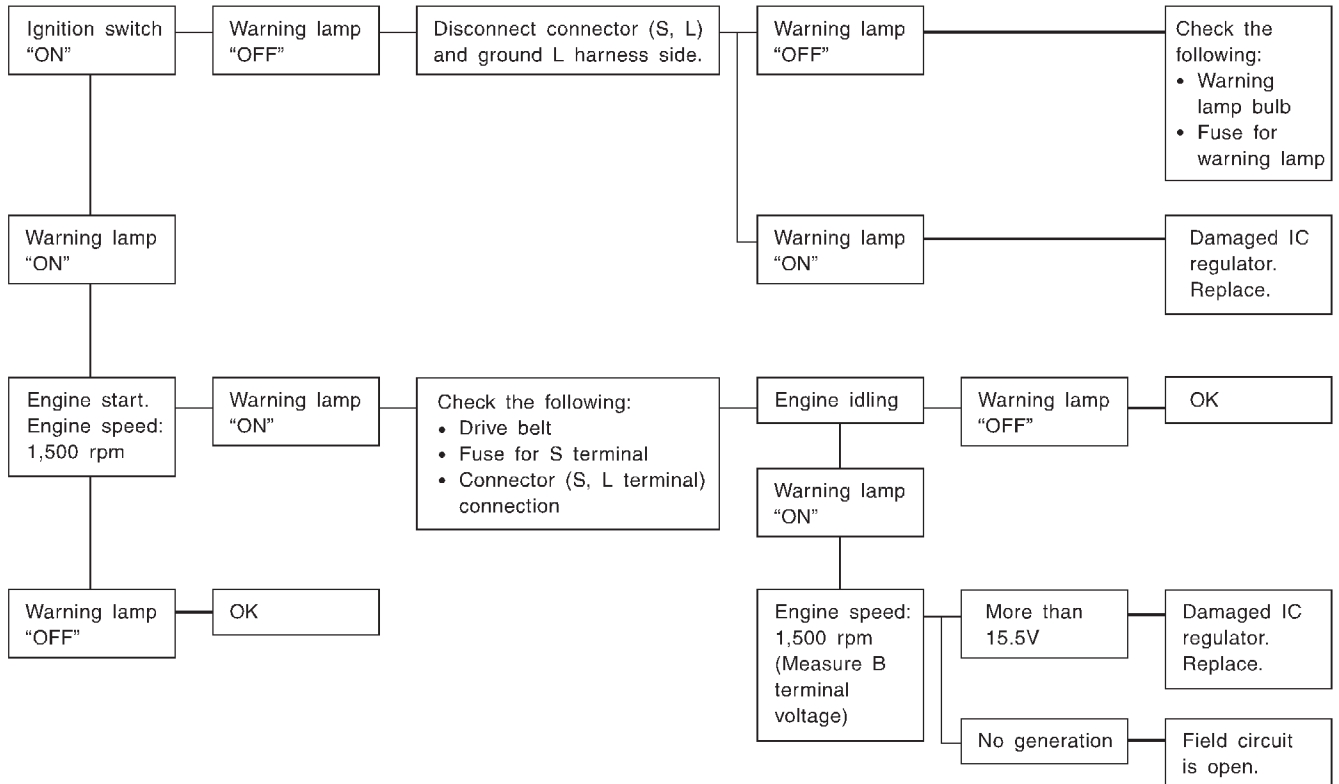
NFSC0011

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

NFSC0011S01



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

NFSC0011S02

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.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

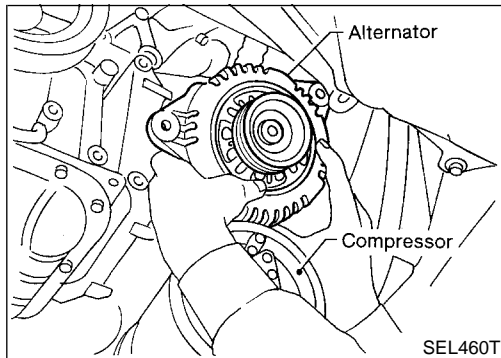
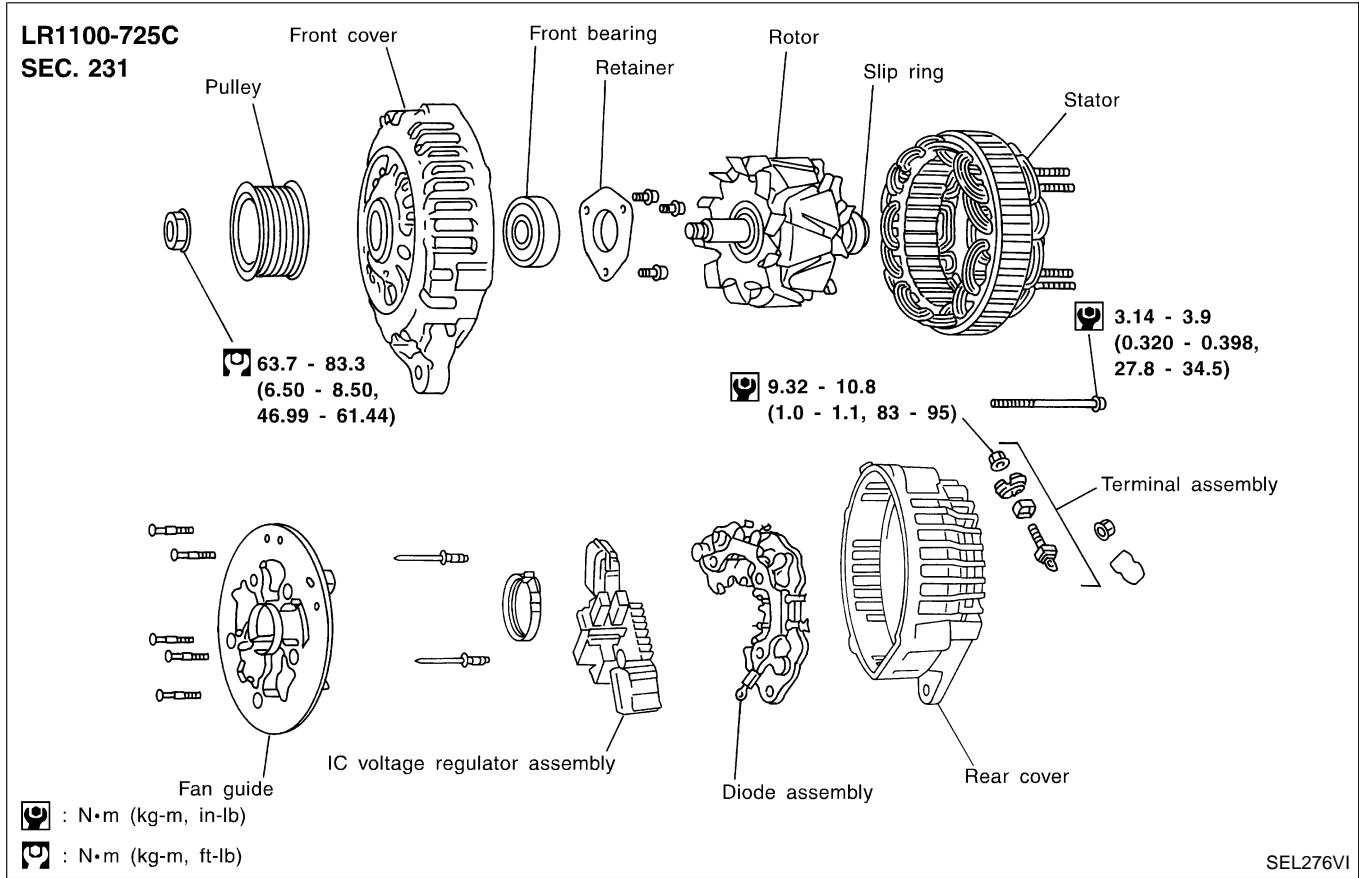
IDX

# CHARGING SYSTEM

Construction

## Construction

NFSC0012



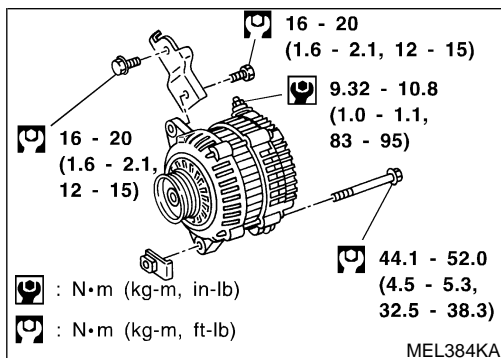
## Removal and Installation

### REMOVAL

1. Remove engine undercover RH.
2. Remove side inspection cover RH.
3. Loosen belt idler pulley.
4. Remove drive belt.
5. Remove A/C compressor mounting bolts (four).
6. Slide A/C compressor forward.
7. Disconnect alternator harness connector.
8. Remove alternator upper bolt and lower bolt.

NFSC0013

NFSC0013S01



### INSTALLATION

To install, reverse the removal procedure.

NFSC0013S02

# SERVICE DATA AND SPECIFICATIONS (SDS)

Battery

## Battery

NFSC0014

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

## Starter

NFSC0015

Type	S114-801D		EM
	HITACHI make		LC
	Reduction gear type		
System voltage	12V		EC
No-load	Terminal voltage	11.0V	
	Current	Less than 90A	FE
	Revolution	More than 2,700 rpm	CL
Minimum diameter of commutator	28.0 mm (1.102 in)		
Minimum length of brush	10.5 mm (0.413 in)		
Brush spring tension	12.7 - 17.7 N (1.3 - 1.8 kg, 2.9 - 4.0 lb)		MT
Clearance between pinion front edge and pinion stopper	0.3 - 2.5 mm (0.012 - 0.098 in)		AT

## Alternator

NFSC0016

Type	LR1100-725C		AX
	HITACHI make		
Nominal rating	12V-110A		SU
Ground polarity	Negative		
Minimum revolution under no-load (When 13.5 volts is applied)	Less than 950 rpm		BR
Hot output current (When 13.5 volts is applied)	More than 33A/1,300 rpm More than 81A/2,500 rpm More than 93A/5,000 rpm		ST
Regulated output voltage	14.1 - 14.7V		
Minimum length of brush	More than 6.00 mm (0.2362 in)		RS
Brush spring pressure	1.000 - 3.432 N (102 - 350 g, 3.60 - 12.34 oz)		
Slip ring minimum outer diameter	More than 26.0 mm (1.024 in)		BT
Rotor (Field coil) resistance	2.31Ω		HA

SC

EL

IDX

## NOTES