

STARTING & CHARGING SYSTEM

SECTION SC

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PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG"

Supplemental Restraint System (SRS) "AIR BAG"

The Supplemental Restraint System "AIR BAG", used along with a seat belt, helps 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), a diagnosis sensor unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **RS section** of this Service Manual. NDSC0001

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.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses are covered with yellow insulation either just before the harness connectors or the complete harness, for easy identification.

Wiring Diagrams and Trouble Diagnosis

When you read wiring diagrams, refer to the following: NDSC0002

- "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 following:

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

BATTERY

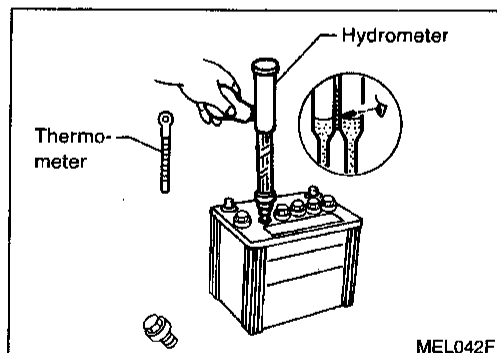
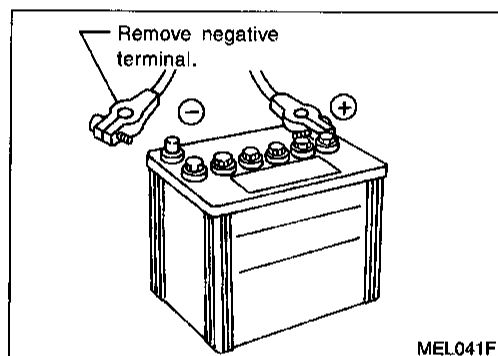
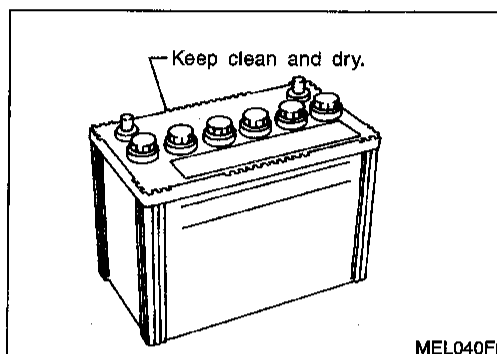
How to Handle Battery

How to Handle Battery

NDSC0003

CAUTION:

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



METHODS OF PREVENTING OVER-DISCHARGE

NDSC0003S01

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

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

CHECKING ELECTROLYTE LEVEL

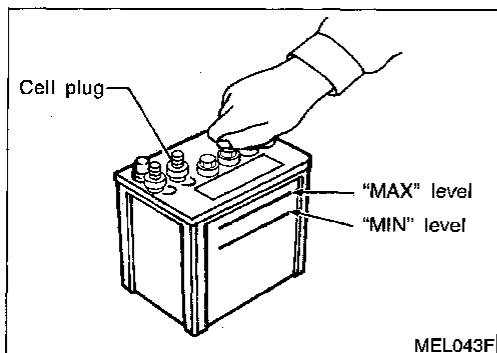
NDSC0003S02

WARNING:

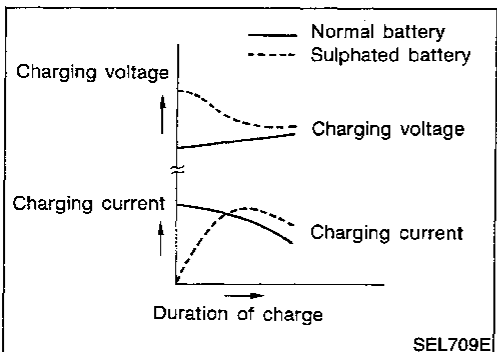
Do not allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, do not touch or rub your eyes until you have thoroughly washed your hands. If acid contacts eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

BATTERY

How to Handle Battery (Cont'd)



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

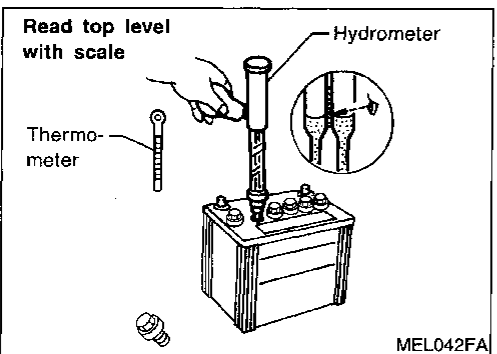


Sulphation

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 (129)	0.020
49 (120)	0.016
43 (110)	0.012
38 (100)	0.008
32 (90)	0.004
27 (80)	0
21 (70)	-0.004
16 (60)	-0.008

BATTERY

How to Handle Battery (Cont'd)

Battery electrolyte temperature °C (°F)	Add to specific gravity reading
10 (50)	-0.012
4 (39)	-0.016
-1 (30)	-0.020
-7 (20)	-0.024
-12 (10)	-0.028
-18 (0)	-0.032

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

CHARGING THE BATTERY

NDSC0003S04

CAUTION:

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

Charging Rates

NDSC0003S0401

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

Do not charge at more than 50 ampere rate.

NOTE:

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

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

STARTING SYSTEM

System Description

System Description

NDSC0004

Power is supplied at all times

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

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

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

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

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

FOR MODELS WITH THEFT WARNING SYSTEM

NDSC0004S01

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

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

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

FOR MODELS WITHOUT THEFT WARNING SYSTEM

NDSC0004S02

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

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

Ground is supplied to park/neutral position (PNP) relay terminal 2, through body grounds E3, E30 and E50.

With power and ground supplied, the park/neutral position (PNP) relay is energized and power is supplied

- from park/neutral position (PNP) relay terminal 6
- to starter motor windings terminal 1.

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

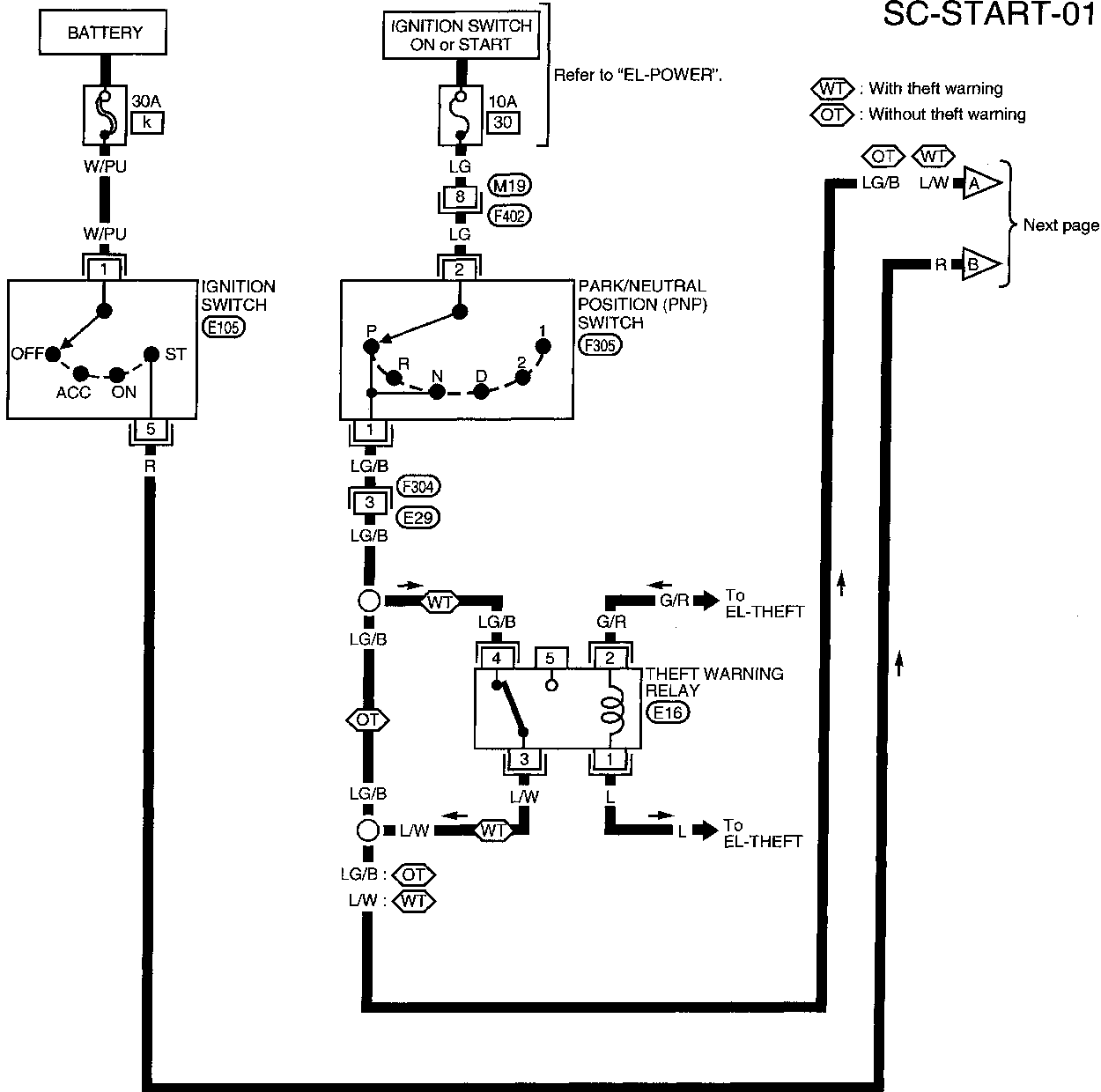
STARTING SYSTEM

Wiring Diagram — START —

Wiring Diagram — START —

NDS0005

SC-START-01



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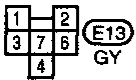
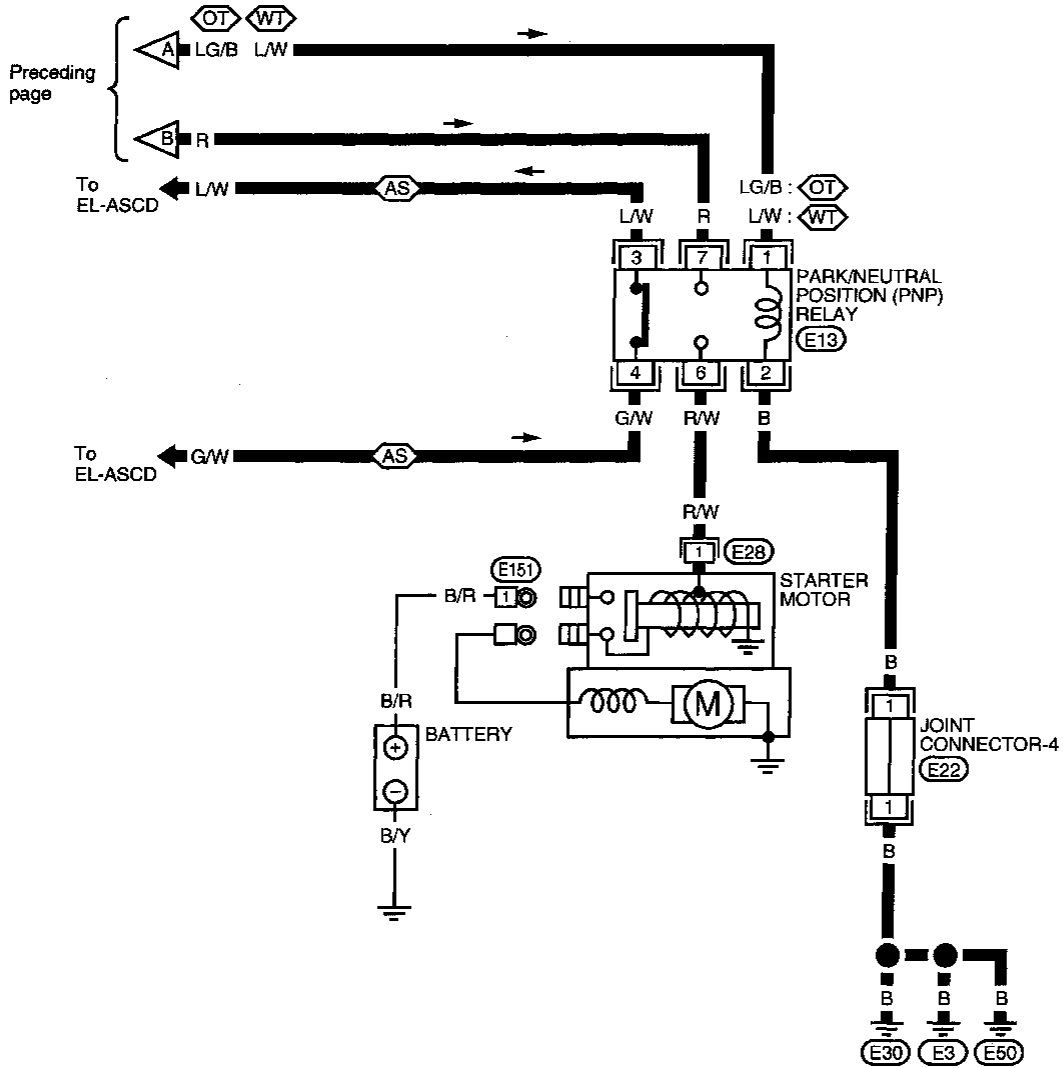
ASC001

STARTING SYSTEM

Wiring Diagram — START — (Cont'd)

SC-START-02

-  : With theft warning
-  : Without theft warning
-  : With ASCD



Refer to last page (Foldout page).



ASC002

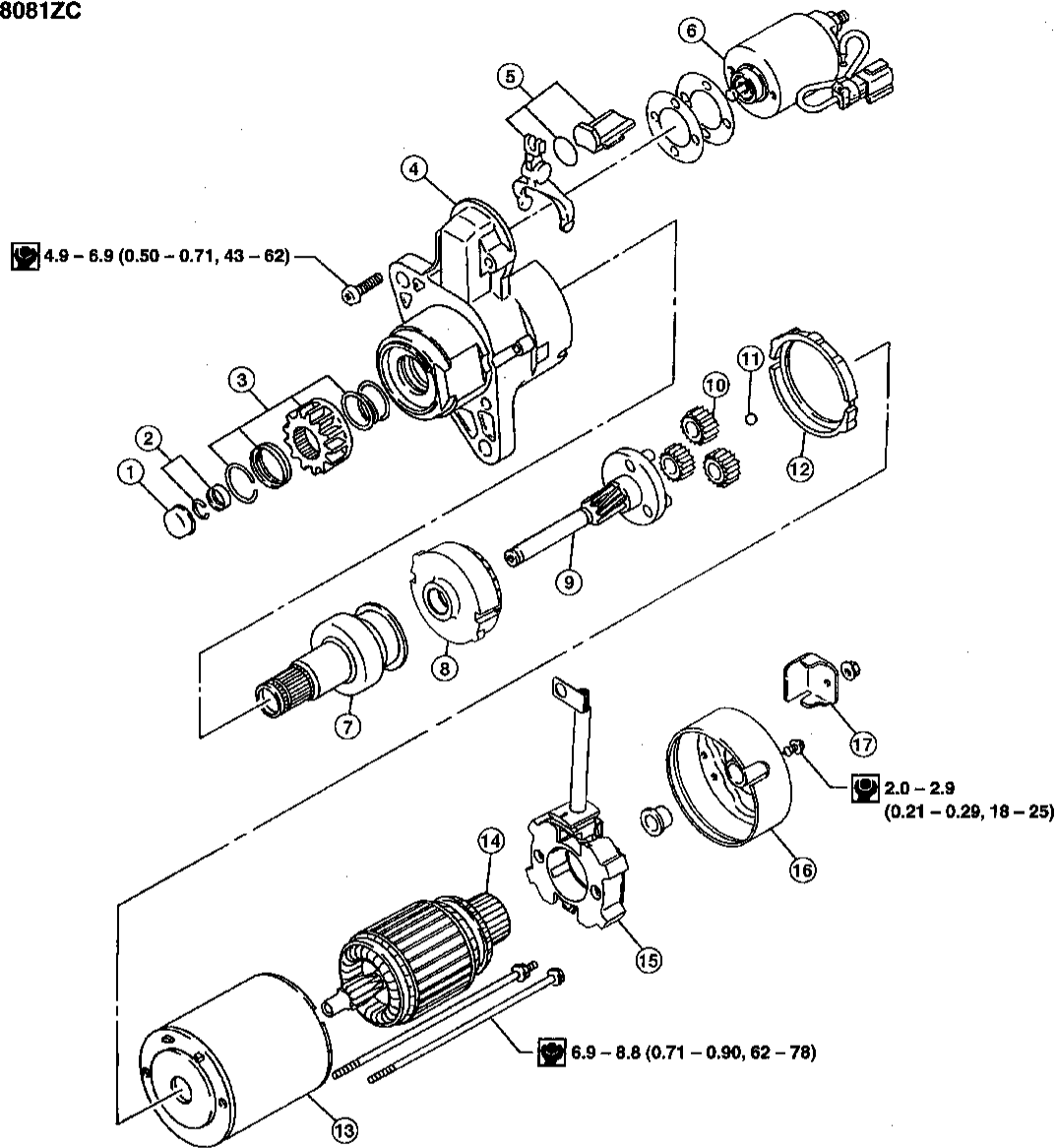
STARTING SYSTEM

Construction

Construction

NDSC0008

SEC. 233
M001T68081ZC



: N·m (kg-m, In-lb)

ASC004

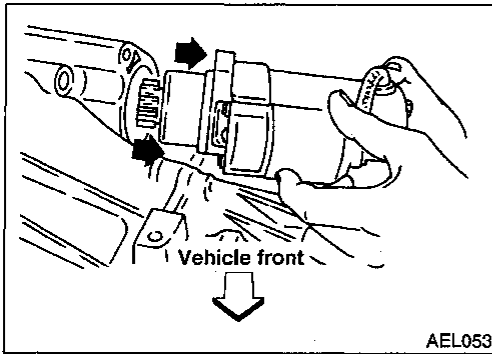
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|-----------------------------|--------------------|--------------------|
| 1. Cap | 7. Clutch gear | 13. Yoke assembly |
| 2. Stopper set | 8. Internal gear | 14. Armature |
| 3. Pinion set | 9. Gear shaft | 15. Brush assembly |
| 4. Front bracket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

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STARTING SYSTEM

Removal and Installation




Removal and Installation

NWSC0007

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

When installing, tighten starter motor mounting bolts.

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

Pinion/Clutch Check

NWSC0008

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

System Description

System Description

NDS0009

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

Power is supplied at all times to generator terminal S through

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

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

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

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

- through 10A fuse (No. 29, located in the fuse block)
- to combination meter terminal 8 for the charge warning lamp.

Ground is supplied to terminal 9 of the combination meter through terminal L of the generator. With power and ground supplied, the charge warning lamp will illuminate. When the generator is providing sufficient voltage with the engine running, the ground is interrupted and the charge warning lamp will go off.

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

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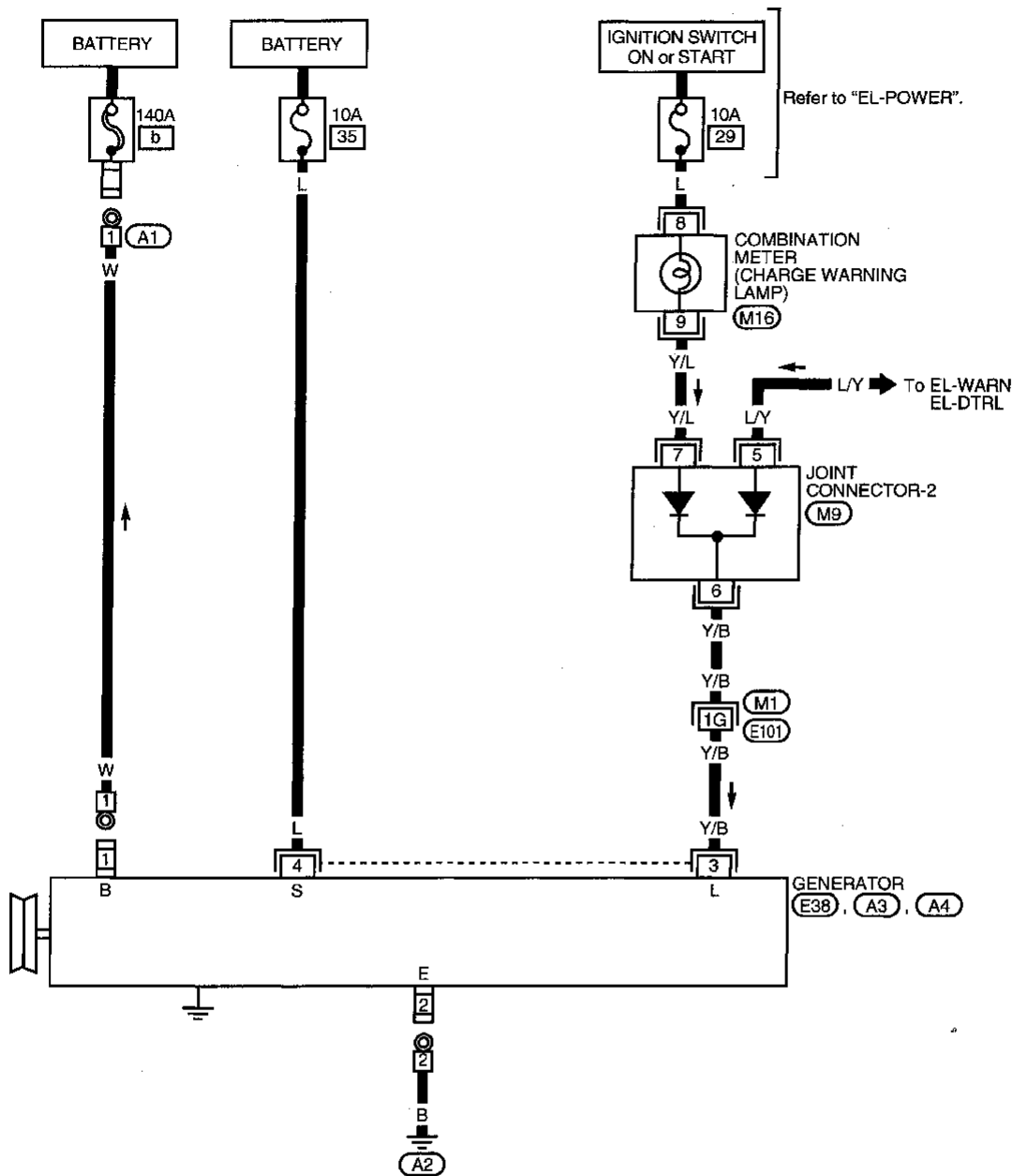
CHARGING SYSTEM

Wiring Diagram — CHARGE —

Wiring Diagram — CHARGE —

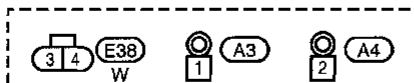
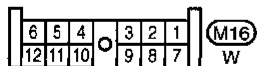
NDSC0010

SC-CHARGE-01



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(M1), (E101)
(M9)

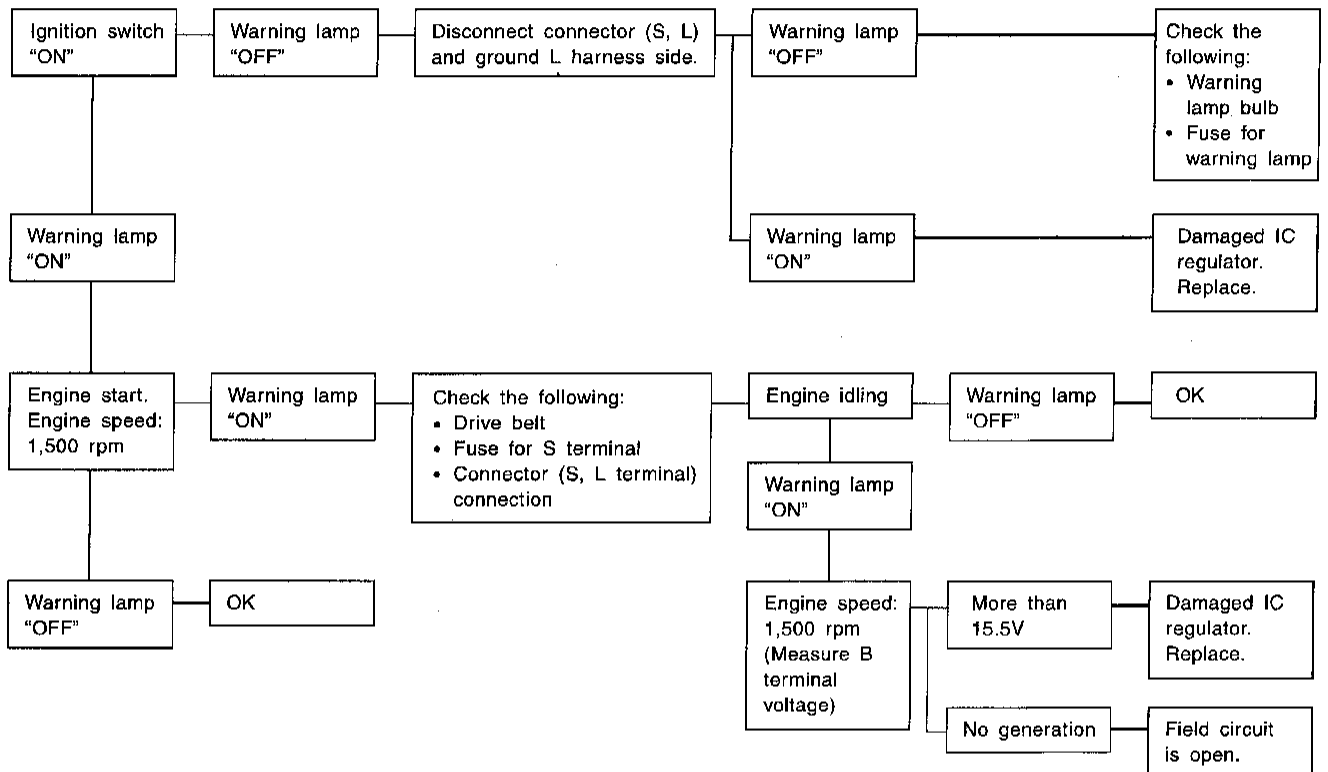


Trouble Diagnoses

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

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

WITH IC REGULATOR



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

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

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

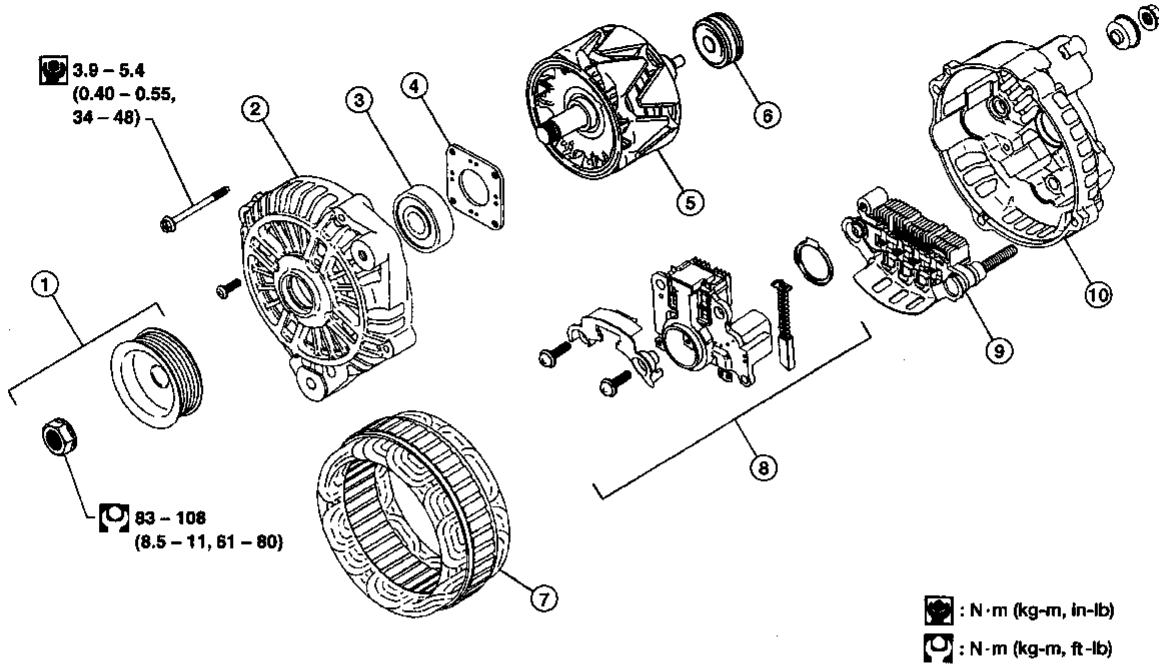
CHARGING SYSTEM

Construction

Construction

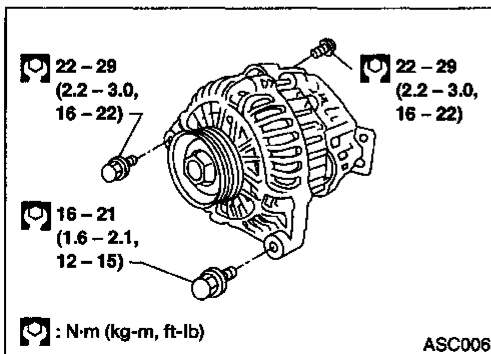
NDSC0012

SEC. 231
ASTA5691ZC



ASC005

- | | | |
|---------------------|-----------------|----------------------------------|
| 1. Pulley assembly | 5. Rotor | 8. IC voltage regulator assembly |
| 2. Front cover | 6. Rear bearing | 9. Diode assembly |
| 3. Front bearing | 7. Stator | 10. Rear cover |
| 4. Bearing retainer | | |



ASC006

Removal and Installation

NDSC0013

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

SC-14

SERVICE DATA AND SPECIFICATIONS (SDS)

Battery

Battery

NDSC0014

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

Starter

NDSC0015

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

Generator

NDSC0016

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