STARTING & CHARGING SYSTEM



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PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG"

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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. **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 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

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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 Batter
H	ow to Handle Battery
C/	AUTION:
•	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

hey are tightly clamped to battery terminals for good contact. Never add distilled water through the hole used to check specific gravity.

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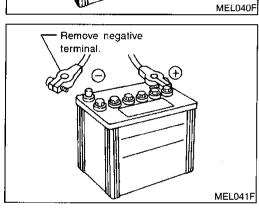
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METHODS OF PREVENTING OVER-DISCHARGE

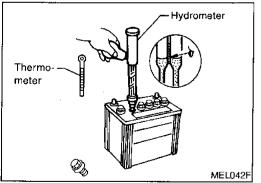
The following precautions must be taken to prevent over-discharging a battery.

- 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" MT and "maintenance-free".
- AT 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.) TF



Keep clean and dry.

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		SU
•	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.	BR

CHECKING ELECTROLYTE LEVEL WARNING:

Do not allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, do not SC 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. EL

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How to Handle Battery (Cont'd)

Cell plug "MAX" level "MIN" level MEL043F Charging voltage Charging current Charging current

BATTERY

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

Sulphation

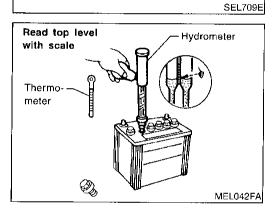
A battery will be completely discharged if it is left unattended for a long time and the specific gravity will become less than 1.100. This may result in sulphation on the cell plates.

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

A sulphated battery may sometimes be brought back into service by means of a long, slow charge, 12 hours or more, followed by a battery capacity test.

SPECIFIC GRAVITY CHECK

1. Read hydrometer and thermometer indications at eye level.



Duration of charge

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

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Hydrometer Temperature Correction

NA\$C0003S0301
Add to specific gravity reading
0.032
0.028
0.024
0.020
0.016
0.012
0.008
0.004
0
-0.004
-0.008
-0.012

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How to Handle Battery (Cont'd)

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AT

c gravity reading	attery electrolyte temperature °C (°F)	
.016	4 (39)	
.020	-1 (30)	
.024	-7 (20)	
.028	-12 (10)	
.032	-18 (0)	
harge condition	Corrected specific gravity	
charged	1.260 - 1.280	
narged	1.230 - 1.250	
narged	1.200 - 1.220	
narged	1.170 - 1.190	
ischarged	1.140 - 1.160	
discharged	1.110 - 1.130	

CHARGING THE BATTERY 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

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 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 $\mathbb{B}_{\mathbb{T}}^{-}$ 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.

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System Description

WITH M/T

Power is supplied at all times

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

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

- through terminal 5 of the ignition switch
- to clutch interlock relay terminal 3.

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

- through 10A fuse [No. 18, located in the fuse block (J/B)]
- to theft warning relay terminal 1 (models with theft warning system) and
- to clutch interlock relay terminal 2.

If the theft warning system is not triggered (models with theft warning system) and clutch pedal is depressed, ground is supplied

- to clutch interlock relay terminal 1.
- through theft warning relay terminal 3, 4 (models with theft warning system) and
- through clutch interlock switch.

The clutch interlock relay is energized and power is supplied

- from terminal 5 of the clutch interlock relay
- to terminal 1 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. If the theft warning system is triggered, terminal 2 of the theft warning relay is grounded and power to the clutch interlock relay is interrupted.

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System Description (Cont'd)

System Description (Conta)	
WITH A/T	GI
Power is supplied at all times	
 to ignition switch terminal 1 	MA
 through 40A fusible link (letter e, located in the fuse and fusible link box). 	
Models without ASCD	EM
With the ignition switch in the ON or START position, power is supplied	EM
 through 10A fuse [No. 18, located in the fuse block (J/B)] 	
 to inhibitor relay terminal 2 (models without theft warning system) to theft warning relay terminal 2 (models with theft warning system) 	LC
 to theft warning relay terminal 3 (models with theft warning system). Also, with the ignition switch in the START position, power is supplied 	
 from ignition switch terminal 5 	EC
 to inhibitor relay terminal 5. 	
If the theft warning system is not triggered, power is supplied	(S) (S) (S)
 through theft warning relay terminal 4 	
 to inhibitor relay terminal 2 (models with theft warning system). 	CL
With the selector lever in the P or N position, ground is supplied	05
 to inhibitor relay terminal 1 through the inhibitor switch. 	
Then inhibitor relay is energized and power is supplied	MT
 from inhibitor relay terminal 3 to terminal 2 of the storter mater windings 	
to terminal 2 of the starter motor windings.	AT
Models with ASCD	
With the ignition switch in the ON or START position, power is supplied through 10A fuse [No. 18, located in the fuse block (J/B)]	ורד
 to inhibitor relay terminal 1 (models without theft warning system) 	
 to theft warning relay terminal 3 (models with theft warning system). 	PD
Also, with the ignition switch in the START position, power is supplied	
 from ignition switch terminal 5 	AX
 to inhibitor relay terminal 6. 	691/2
If the theft warning system is not triggered, power is supplied	010
 through theft warning relay terminal 4 to inhibitor values to value a value with the flow arises another.) 	su
 to inhibitor relay terminal 1 (models with theft warning system). With the collector lever in the D or N position, ground is supplied. 	
 With the selector lever in the P or N position, ground is supplied to inhibitor relay terminal 2 through the inhibitor switch. 	BR
Then inhibitor relay is energized and power is supplied	
 from inhibitor relay terminal 7 	Sĩ
• to terminal 2 of the starter motor windings.	
The starter motor plunger closes and provides a closed circuit between the battery and starter motor. The	RS
starter motor is grounded to the engine block. With power and ground supplied, cranking occurs and the engine	
starts.	50
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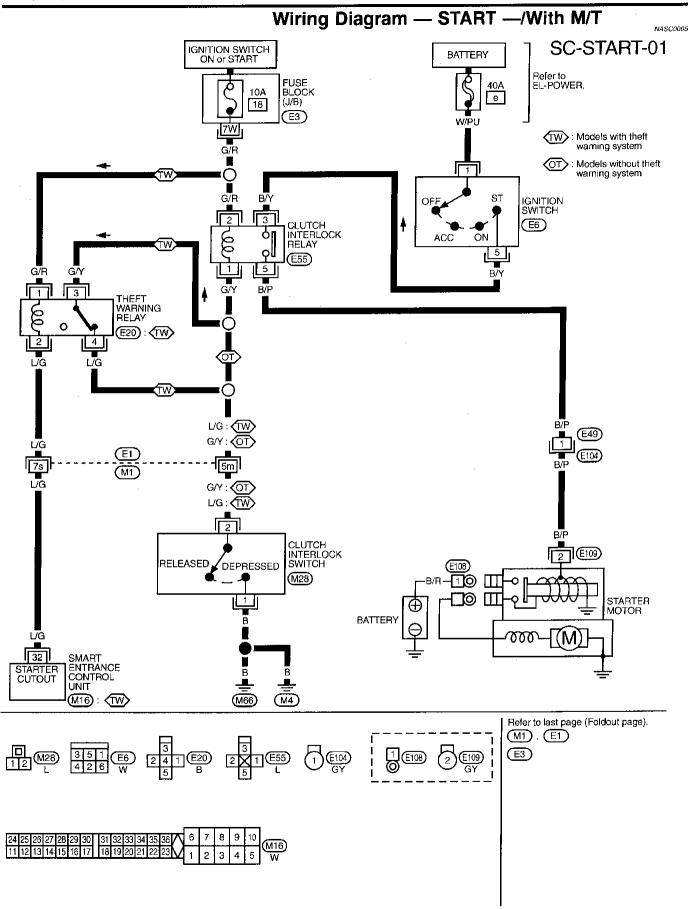
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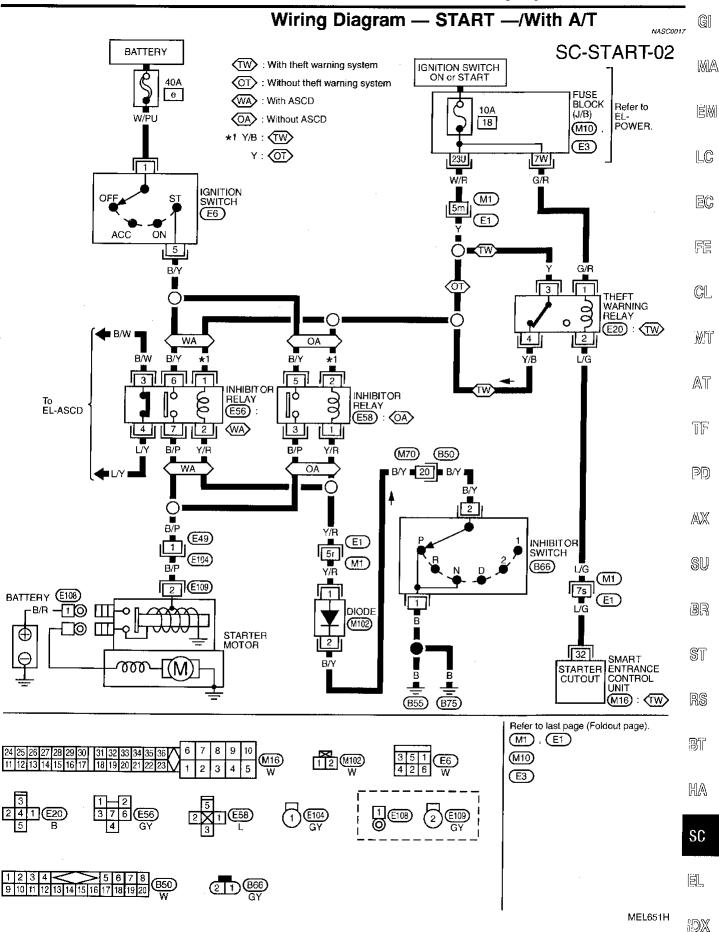
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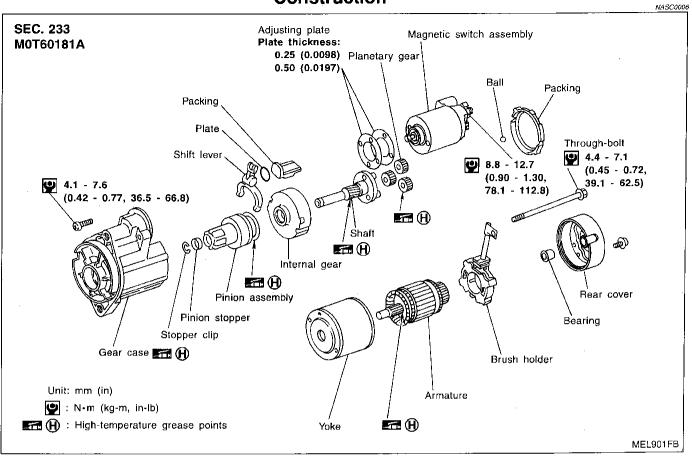
Wiring Diagram - START -/With A/T

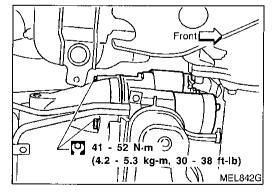


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Construction





Removal and Installation

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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.

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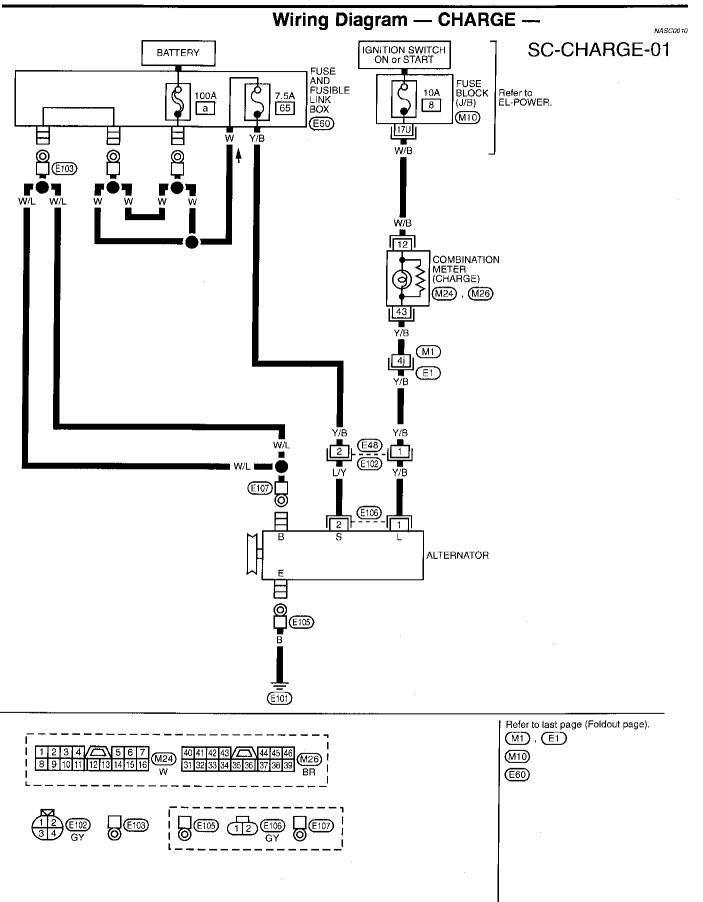
System Description	GI
The alternator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC regulator. Power is supplied at all times to alternator terminal S through:	MA
 100A fusible link (letter a, located in the fuse and fusible link box), and 7.5A fuse (No. 65, located in the fuse and fusible link box). 	EM
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 100A fusible link. Terminal E of the alternator supplies ground through body ground E101.	LC
 With the ignition switch in the ON or START position, power is supplied through 10A fuse [No. 8, located in the fuse block (J/B)] to combination meter terminal 12 for the charge warning lamp. 	EĊ
Ground is supplied to terminal 43 of the combination meter through terminal L of the alternator. With power	FE
and ground supplied, the charge warning lamp will illuminate. When the alternator is providing sufficient volt- age 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.	CL
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	TF
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CHARGING SYSTEM



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CHARGING SYSTEM

Trouble Diagnoses

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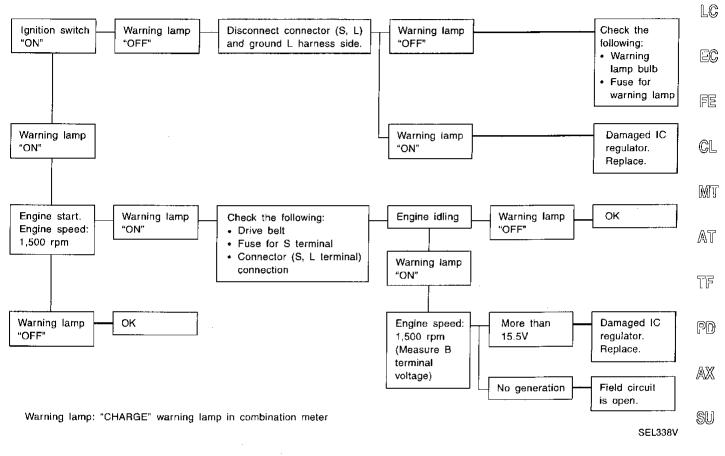
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Trouble Diagnoses

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



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 sparts with new ones.

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.

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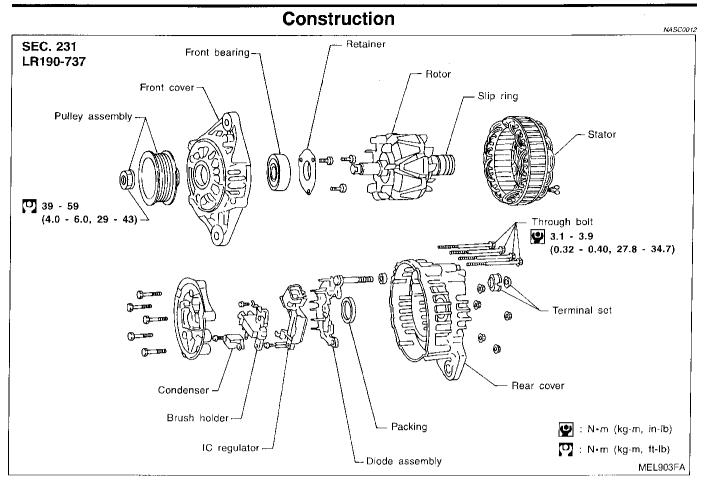
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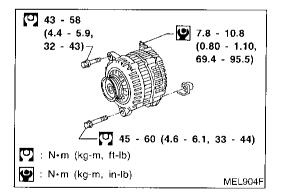
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CHARGING SYSTEM







Removal and Installation

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SERVICE DATA AND SPECIFICATIONS (SDS)

Battery

		Battery		NA	SC001
		USA		Canada	
Applied area	S	Standard	Option	Standard	
Туре	Ę	55D23R		75D31R	
Capacity V-AH		12-60 12-70		12-70	
Cold cranking current A (For reference value)		356		447	
		Starter		NA	SC0019
	·····	<u> </u>		M0T60181A	
Туре			MITSUBISHI make		
			Reduction gear type		
System voltage				12V	
	Terminal voltage			11.0V	
No-load	Current			Less than 90A	
	Revolution			More than 2,500 rpm	
Minimum diameter of commutator				28.8 mm (1.134 in)	
Minimum length of brush				7.0 mm (0.276 in)	
Brush spring tension			18.3 - 24.8	3 N (1.87 - 2.53 kg, 4.11 - 5.58 lb)	
Clearance between pinior	n front edge and pinion stop	oper mm (in)		_	
		Alternat	or	NAS	C0016
				LR190-737	
Туре				HITACHI make	
Nominal rating 12V-90A		12V-90A			
Ground polarity	Ind polarity		Negative		
Minimum revolution under	nimum revolution under no-load (When 13.5 volts is applied)		s applied) Less than 1,000 rpm		
Hot output current (When 13.5 volts is applied) More than 65A/2,500 rpm More than 87A/5,000 rpm		than 65A/2,500 rpm			
Regulated output voltage			14.1 - 14.7V		
Minimum length of brush			6.	0 mm (0.236 in)	
Brush spring pressure			1.471 - 3.432 N	(150 - 350 g, 5.29 - 12.34 oz)	. –
Slip ring minimum outer d	liameter		26	.0 mm (1.024 in)	

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