

# ALTERNATOR & REGULATOR - HITACHI & MITSUBISHI

1992 Infiniti G20

1992 ELECTRICAL  
Infiniti Alternators & Regulators - Hitachi & Mitsubishi  
G20, M30, Q45

## DESCRIPTION

Hitachi and Mitsubishi alternators are conventional 3-phase, self-rectifying alternators. Three positive and 3 negative diodes are used to rectify current. All models are equipped with Integrated Circuit (IC) voltage regulators.

On G20 and M30 models, a diode on the charge indicator light circuit monitors alternating voltage at the stator. Charge indicator light remains off when monitored voltage and charging voltage are equal.

## APPLICATION

### ALTERNATOR APPLICATION

Vehicle Model	Voltage (Amperage) Rating	Model & Number
G20	12 (80)	Hitachi LR180-725
"	12 (80)	Mitsubishi A2T13894
M30	12 (90)	Hitachi LR190-714
Q45	12 (110)	Hitachi LR1110-702

## ADJUSTMENTS

### ALTERNATOR BELT

#### ALTERNATOR BELT DEFLECTION

Application	New Belt (1)	Used Belt (1)
G20 (2)		
With A/C	.256-.295 (6.5-7.5)	.28-.31 (7-8)
Without A/C	.28-.31 (7-8)	.31-.35 (8-9)
M30 (3)	.295-.335 (7.5-8.5)	.256-.295 (6.5-7.5)
Q45 (4)	.295-.335 (7.5-8.5)	.35-.39 (9-10)

(1) - Measured as In. (mm) with 22 lbs. (10 kg) pressure applied center of longest belt run.

(2) - Used belt limit is .453-.492" (11.5-12.5 mm) with A/C. Used belt limit is .47-.51" (12-13 mm) without A/C.

(3) - Used belt limit is .47" (12 mm).

(4) - Used belt limit is .55" (14 mm).

## TROUBLE SHOOTING

NOTE: See TROUBLE SHOOTING - BASIC PROCEDURES article in the GENERAL TROUBLE SHOOTING section.

## ON-VEHICLE TESTING

### Alternator Test

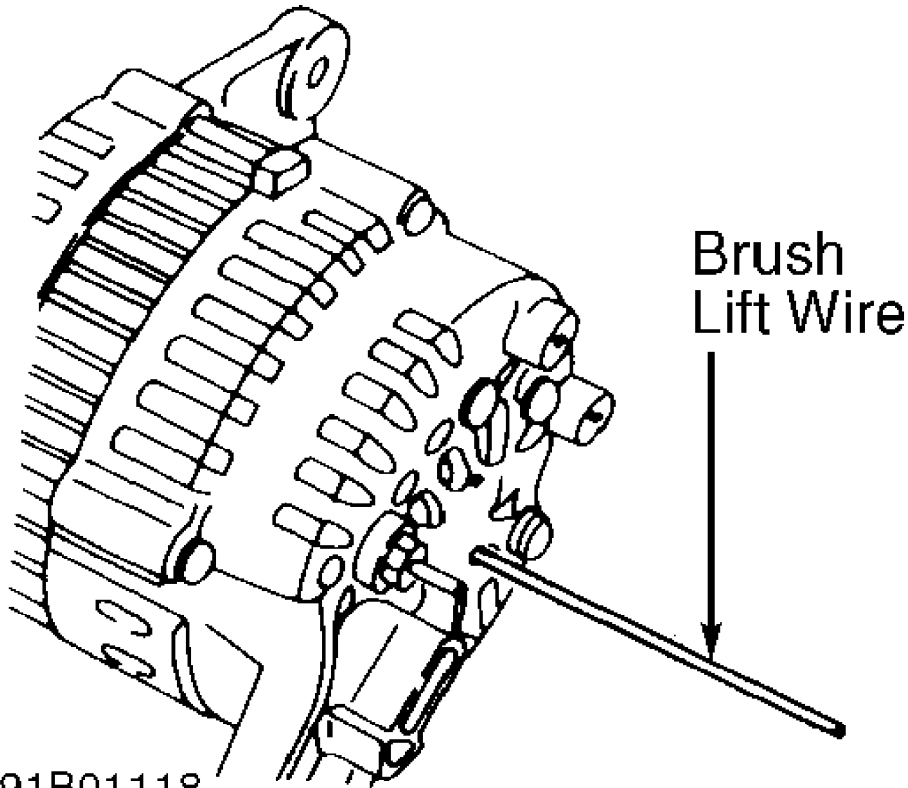
1) Ensure battery is fully charged before beginning test. Turn ignition on, and check charge indicator light on instrument panel. If light comes on, go to step 3).

NOTE: Terminals "S", "L", "B", and "E" are marked on alternator's rear cover. Terminal "F" is an internal terminal.

2) If light is off, disconnect "S" and "L" connector, and ground wire of terminal "L". If light remains off, replace indicator bulb and recheck. If light comes on with Hitachi alternator, reconnect "S" and "L" connector. Ground internal terminal "F" using a stiff wire. See Fig. 1. If light is off, repair alternator. If light is on, replace IC regulator. If light comes on with Mitsubishi alternator, go to BENCH TESTING.

3) On vehicles with Hitachi alternator, start and run engine at idle. If light is dim, flickers or remains on (bright), check drive belt. If drive belt is okay or light remains the same after adjusting belt, repair alternator. If light goes off, system is okay. If light goes out after initial engine start up, operate engine at 1500 RPM and turn on headlights.

4) If indicator light comes on, repair alternator. If indicator light remains off, run engine at 1500 RPM and measure voltage at terminal "B". If voltage is more than 15.5 volts, replace IC regulator. If voltage is 13-15 volts, alternator and regulator are okay.



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Fig. 1: Grounding Terminal "F" (Hitachi)  
Courtesy of Nissan Motor Co., U.S.A.

### BENCH TESTING

### Rotor

Connect ohmmeter leads to each of the rotor slip rings. If continuity is present, rotor is okay. If continuity is NOT present, replace rotor. Connect an ohmmeter lead to any rotor slip ring. Connect other lead to rotor core. If continuity exists, replace rotor assembly. Ensure slip ring diameter exceeds minimum specification. See SLIP RING MINIMUM DIAMETER table.

### SLIP RING MINIMUM DIAMETER

Application	In. (mm)
Hitachi	
LR180-725 (G20) .....	1.024 (26.0)
LR190-714 (M30) .....	1.205 (30.6)
LR1110-702 (Q45) .....	1.205 (30.6)
Mitsubishi	
A2T13894 (G20) .....	.870 (22.1)

NOTE: To test stator or diodes, separate them by unsoldering the connecting wires. Use just enough heat to melt solder. Excessive heat will damage diodes.

### Stator

Using ohmmeter, check continuity between stator core leads. If continuity is NOT present between leads, replace stator. Check continuity between stator core and each stator lead. If continuity is NOT present, stator is good. If continuity exists, stator is grounded and must be replaced.

### Diodes

Using an ohmmeter, check continuity of all diodes in both directions. See Figs. 2-5. Ensure continuity exists in only one direction. If continuity exists in both directions, diode is shorted. If continuity is NOT present in either direction, diode is open. If any diode is defective, replace entire diode assembly. See TESTING ALTERNATOR DIODES table.

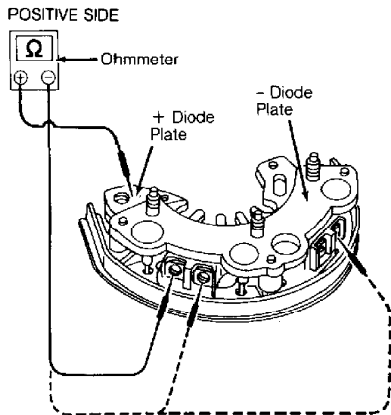


Fig. 2: Testing Alternator Diodes Positive Side (G20 & Q45 - Hitachi)  
Courtesy of Nissan Motor Co., U.S.A.

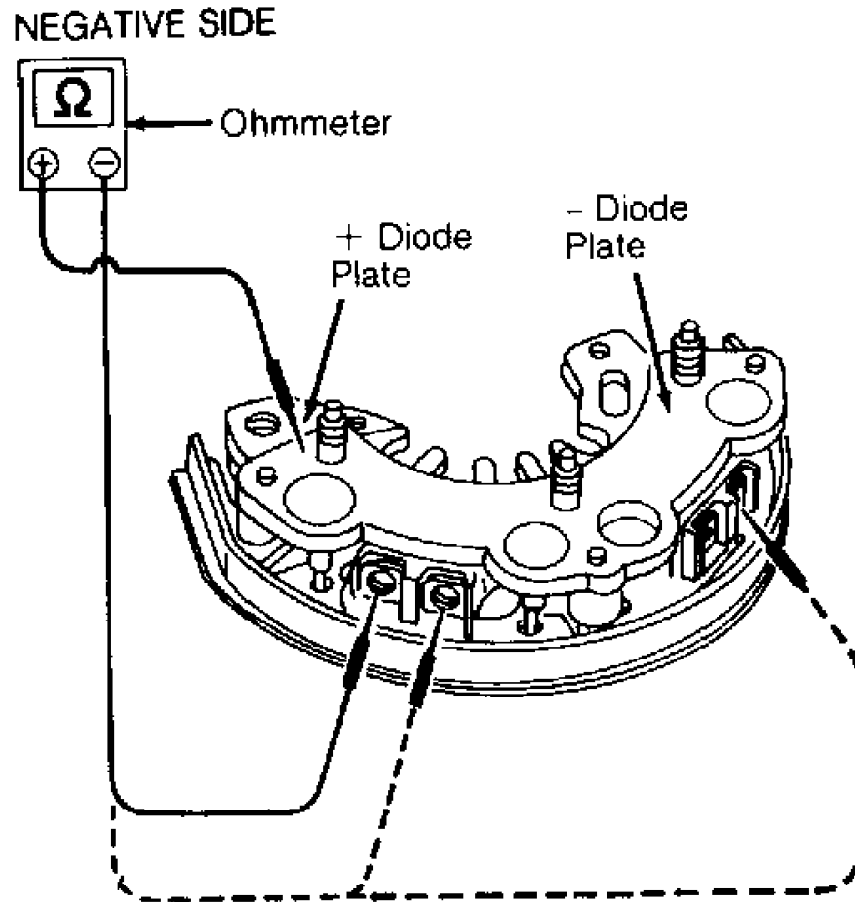


Fig. 3: Testing Alternator Diodes Negative Side (G20 & Q45 - Hitachi)  
 Courtesy of Nissan Motor Co., U.S.A.

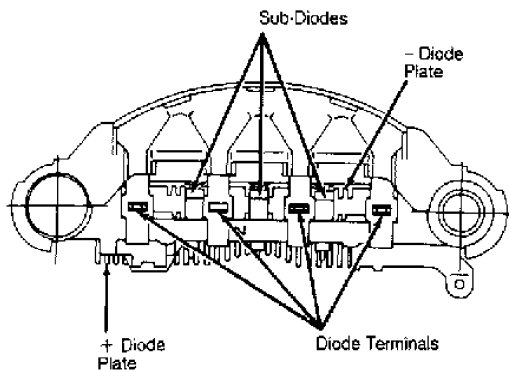


Fig. 4: Identifying Alternator Diode Test Points (G20 - Mitsubishi)  
 Courtesy of Nissan Motor Co., U.S.A.

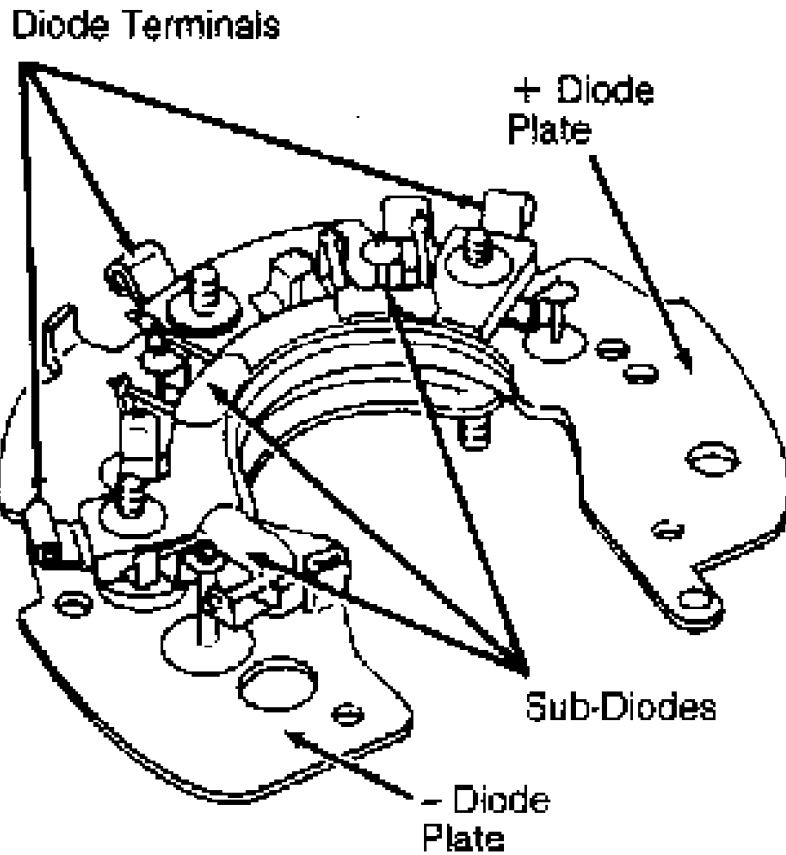


Fig. 5: Identifying Alternator Diode Test Points (M30 - Hitachi)  
 Courtesy of Nissan Motor Co., U.S.A.

TESTING ALTERNATOR DIODES

Positive Meter Lead	Negative Meter Lead	Continuity
+ Diode Plate	Diode Terminals	Yes
Diode Terminals	+ Diode Plate	No
- Diode Plate	Diode Terminals	No
Diode Terminals	- Diode Plate	Yes

Brushes

Inspect brushes for free movement in holder. Clean brush holder if necessary. Check brushes for cracks and wear. Check brush springs for corrosion or damage. Ensure brushes are not worn beyond minimum length (limit mark scribed on brush). If brushes do not have a scribed minimum length mark, ensure brush length exceeds minimum specification. See MINIMUM BRUSH LENGTH table.

MINIMUM BRUSH LENGTH

Application	In. (mm)
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Hitachi		
LR180-725 (G20)	.....	.236 (6.0)
LR190-714 (M30)	.....	.236 (6.0)
LR1110-702 (Q45)	.....	.236 (6.0)
Mitsubishi		
A2T13894 (G20)	.....	.31 (8.0)

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## OVERHAUL

NOTE: A ring is used to lock outer bearing race in alternator's rear cover. It may be necessary to heat bearing housing to remove cover. Use a 200-watt soldering iron to heat housing. DO NOT use heat gun as it may damage diode. See Figs. 6-8.

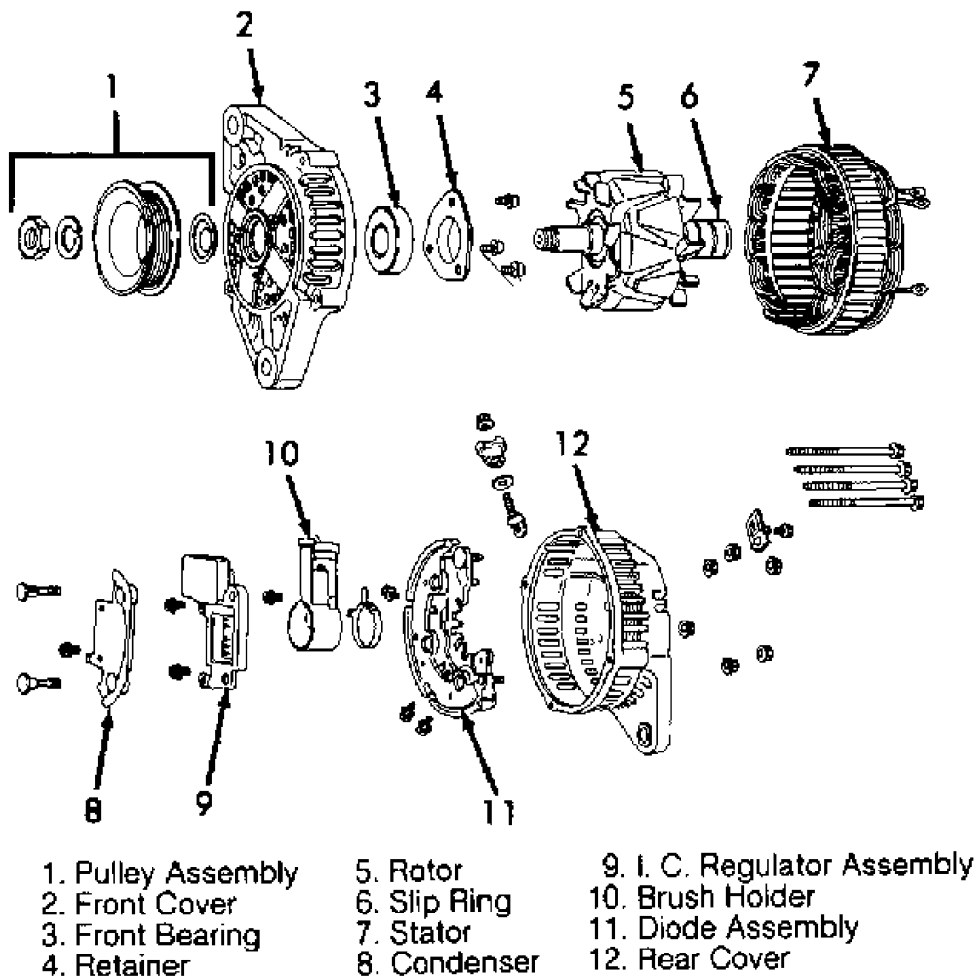


Fig. 6: Exploded View Of Alternator (G20 - Hitachi)  
 Courtesy of Nissan Motor Co., U.S.A.

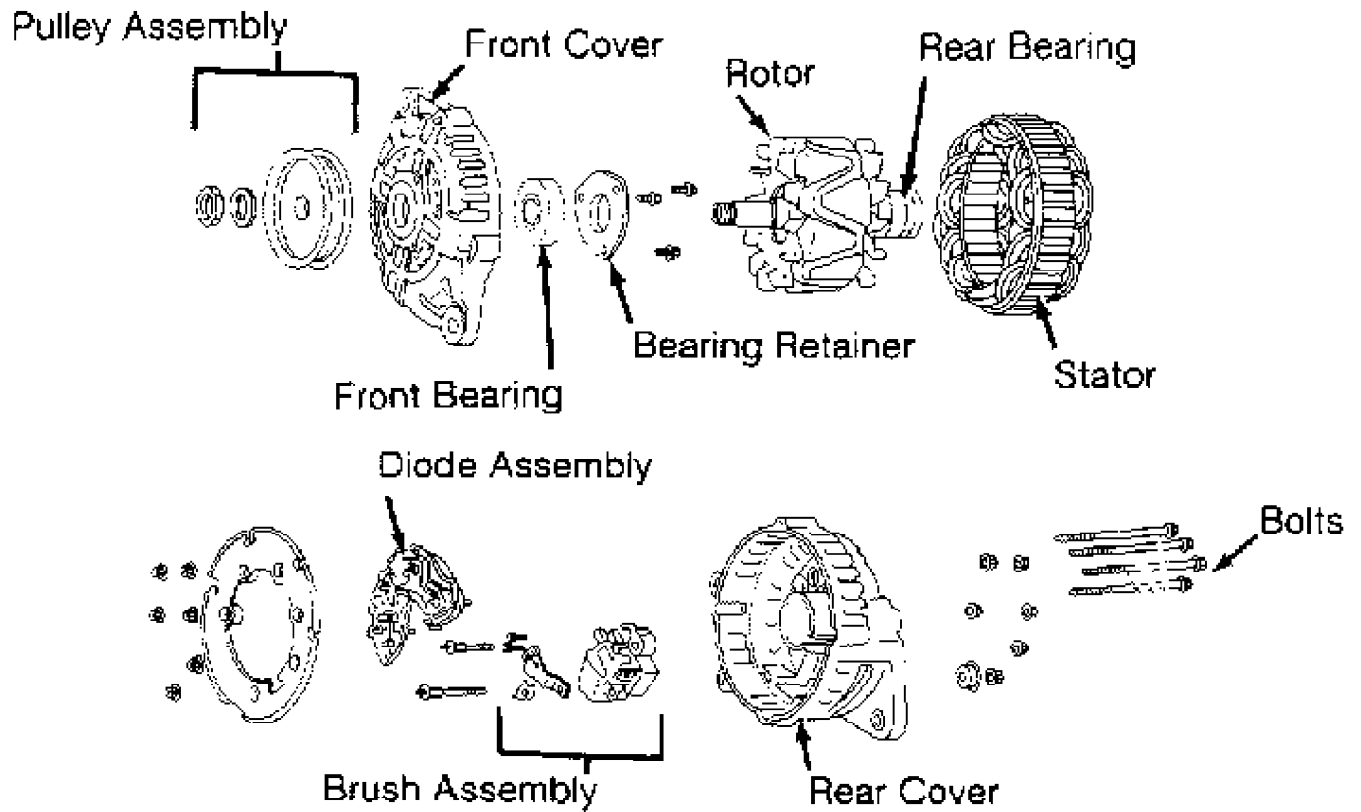


Fig. 7: Exploded View Of Alternator (M30 Is Shown; Q45 Is Similar - Hitachi)  
 Courtesy of Nissan Motor Co., U.S.A.

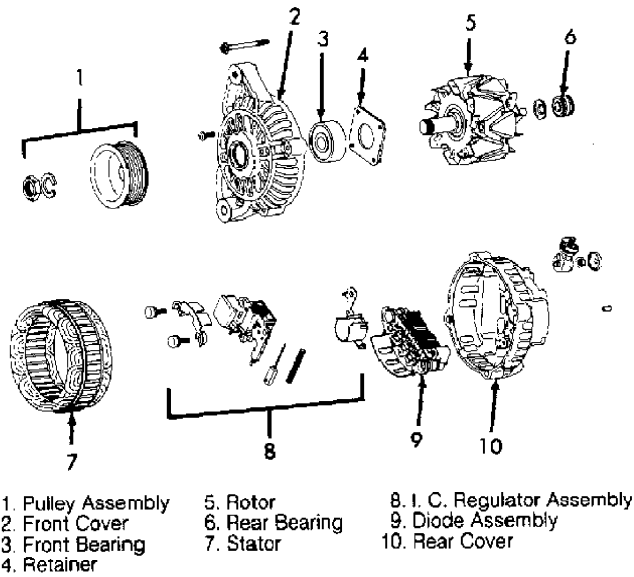


Fig. 8: Exploded View Of Alternator (G20 - Mitsubishi)  
 Courtesy of Nissan Motor Co., U.S.A.