Alternators & Regulators

DELCO-REMY WITH INTEGRAL REGULATOR

Chevrolet, GMC, Jeep

DESCRIPTION

Delco 10SI, 15SI and 27SI Integral regulator alternators feature a solid state regulator mounted inside alternator. These alternators are available with different outputs at idle and different maximum outputs.

Delcotrons consist of 2 separate housings (end frame assemblies), a rotor, stator, brushes, slip rings and diodes. Rotor is supported in drive end frames by ball bearings and in slip ring end frame by roller bearings. Bearings contain enough lubrication to eliminate need for periodic lubrication.

Fig. 1: Cutaway View Showing Internal Components of Delcotron Integral Regulator Alternator

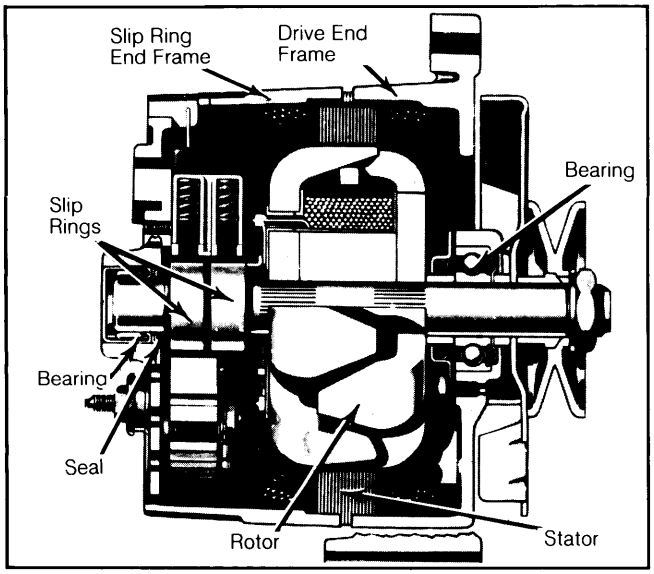


Illustration applies to Chevrolet, GMC & Jeep.

IDENTIFICATION

Alternator rated ampere output is stamped on alternator case.

CHEVROLET & GMC SPECIFICATIONS

Amperage	Part No.
37	1100140
	1100201
	1102394
	1102491
	1102889
42	1102485
	1102841
	1102887
61	1102480
	1102486
	1102886
	1102888
63	1100146
	1100202
80	1101016
	1101028

JEEP SPECIFICATIONS

Amperage	Part No.
42	1100158
	1100159
55	1103155
63	1100129
	1100132
	1103196
70	1101087
	1101093
	1101094
	1101436
85	[1]

[1] — Information not available from manufacturer. Police option.

OPERATION

Two brushes carry current through slip rings to and from field coil mounted on rotor. Stator windings are assembled on the inside of a laminated core that forms part of the alternator frame.

A rectifier bridge, connected to stator windings, contains 6 diodes (3 positives and 3 negatives) molded into an assembly. This rectifier bridge changes stator A.C. voltage into D.C. voltage, which appears at output terminal.

The blocking action of the diodes prevents battery discharge back through alternator. Because of the blocking action, the need for a cutout relay is eliminated. Alternator field current is supplied through a diode trio which is also connected to stator windings.

A capacitor is mounted in end frame, protecting rectifier bridge and diodes from high voltage and suppressing radio interference noise. Some vehicles are equipped with ammeters, others with voltmeters.

ADJUSTMENT

No periodic adjustments or maintenance of any kind is required on alternator assembly. Regulator voltage is preset, and no adjustment is possible.

CAUTION: Do not attempt to polarize alternator. Do not short or ground any terminals except as instructed. Never operate alternator with battery out of circuit or output terminal open. Alternator and battery must share same ground polarity.

TESTING

NOTE: Before making electrical checks, visually inspect all terminals for clean and tight connections. Check alternator mounting bolts and drive belt tension. Do not ground No. 2 lead wire. Battery must be in good condition to test charging system.

UNDERCHARGED BATTERY

1) With ignition switch "ON", connect a voltmeter from alternator "BAT" terminal to ground, then from

DELCO-REMY WITH INTEGRAL REGULATOR (Cont.)

No. 1 terminal to ground, and last, No. 2 terminal to ground. A zero reading indicates an open between connection and battery.

2) Opens in the No. 2 lead may be between terminals at the crimp between harness wire and terminal, or in wire. *See Fig. 2.*

NOTE: If preceding test is satisfactory, continue to next step.

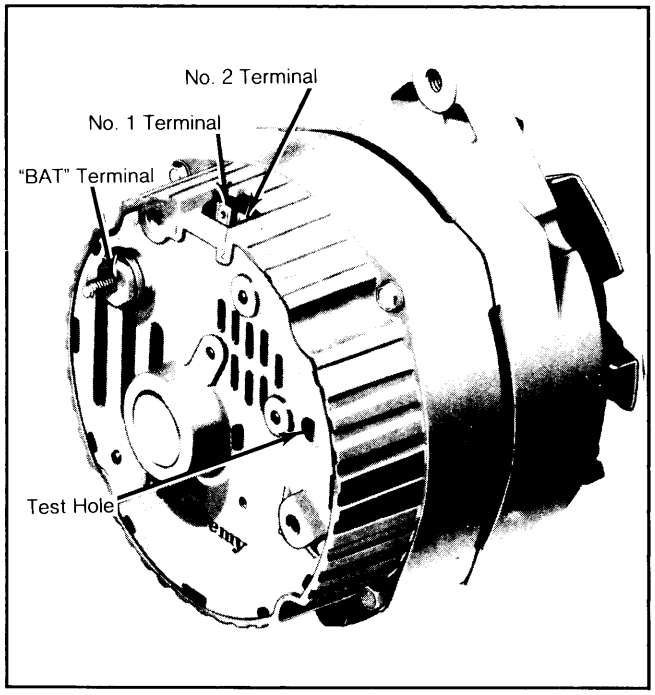
3) Disconnect battery ground cable. Connect an ammeter in circuit at "BAT" terminal of alternator.

4) Reconnect battery ground cable. Turn on all available accessories. Connect a carbon pile across battery. Operate engine at moderate speed and adjust carbon pile as required to obtain maximum current output.

5) If ampere output is within 10 amps of rated output as stamped on alternator case, alternator is good.

6) If output is not within 10 amps of rated output, ground field winding by inserting a screwdriver into test hole. *See Fig. 2.*

Fig. 2: Identification of Delcotron Terminal Locations All Models



Visually inspect all terminals for clean and tight connections.

CAUTION: Tab is within ¾" (19 mm) of casting surface. Do not force screwdriver deeper than 1" (25 mm) into end frame. If test hole is not accessible, proceed to "Testing (On Bench)" as described under Overhaul.

7) Operate engine at moderate speed as required and adjust carbon pile for maximum output.

8) If output is now within 10 amps of rated output with fields grounded, regulator is defective and requires replacement.

9) If output is still not within 10 amps of rated output, check field winding, diode trio, rectifier bridge, and stator.

OVERCHARGED BATTERY

Connect a voltmeter from alternator terminal No. 2 to ground. If reading is zero, No. 2 lead circuit is open. If battery and No. 2 lead circuit check out good, alternator will have to be disassembled for further checks. *See Overhaul.*

OVERHAUL

DISASSEMBLY

1) Scribe marks on housings for reassembly reference. Remove through bolts connecting housings. Separate front and rear housings by prying apart with screwdriver.

2) Place a piece of tape over slip ring end frame bearing to prevent entry of dirt. At this point brushes may drop onto rotor shaft and become contaminated with bearing lubricant. Clean brushes as soon as possible with a cleaner (acetone) to keep them from becoming grease soaked.

3) Place rotor in vise and tighten vise only enough to permit removal of shaft nut. Remove shaft nut, washer, pulley, fan and collar. Separate front housing from rotor shaft. Remove 3 stator lead attaching nuts and remove stator leads from bridge terminal.

4) Separate stator from rear housing. Remove diode trio lead clip attaching screw, and remove diode trio. Remove capacitor attaching screw and remove capacitor lead from bridge rectifier.

5) Remove bridge rectifier and battery terminal attaching screws and remove bridge rectifier. Remove 2 brush holder screws and 1 diode trio lead strap screw. Remove brush holder and brushes. Note location of brushes for reassembly.

6) Remove voltage regulator. Remove front bearing retaining plate screws. Press front bearing out of housing with collar. Press out rear bearing from housing by inserting collar inside housing and pressing bearing toward the outside.

INSPECTION

Wash all metal parts except bearings, stator and rotor. Inspect rotor slip rings. They may be cleaned with 400 grain polishing cloth, while rotor is being rotated. Slip rings may be lathe turned to .002" (.051 mm) maximum indicator reading.

Slip rings are not replaceable. Excessive damage will reguire rotor replacement. Inspect brushes for wear, replacing them if more than 50% worn.

TESTING (ON BENCH)

Rotor Field Winding Test

1) Check rotor for grounds or an open circuit, using a 110-volt test lamp or an ohmmeter. *See Fig. 3.* To check for grounds, connect ohmmeter leads to shaft and slip ring (each ring in turn). No continuity should exist.

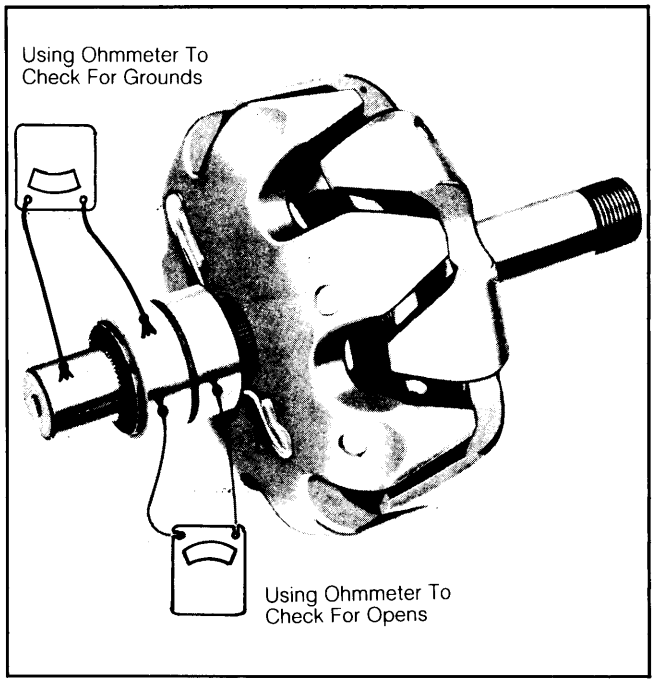
2) To test for open field, connect ohmmeter leads to each slip ring. Continuity should be indicated.

3) To test for shorts, connect a 12-volt battery and ammeter in series with both slip rings. Current draw is used for this test.

4) Resistance should be 2.5-3.0 ohms. Excessive amperage draw or low resistance indicates shorted windings. If rotor tests okay, but alternator output is low, continue with tests.

DELCO-REMY WITH INTEGRAL REGULATOR (Cont.)

Fig. 3: Bench Testing Rotor For Opens or Grounds Using an Ohmmeter

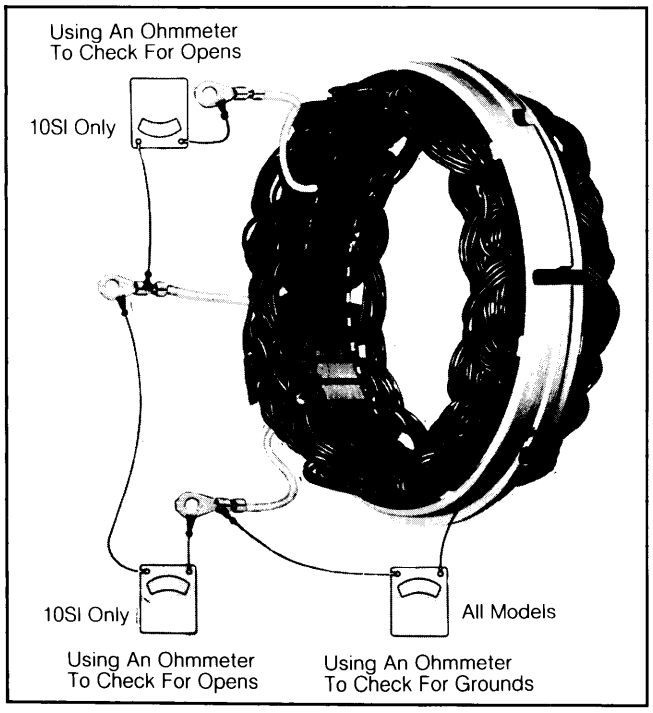


Check rotors using a 110-volt test lamp or an ohmmeter.

Stator Ground Test

1) Connect leads of 110-volt test lamp or an ohmmeter (x1000 scale) to any stator lead and to stator frame. Ohmmeter reading should be infinite. *See Fig. 4.*

Fig. 4: Bench Testing Stator for Open or Grounded Circuits



Test Circuits Using an Ohmmeter.

2) If test lamp lights or if resistance is low, windings are grounded. Replace stator assembly.

Stator Open Test

1) Connect a 110-volt test lamp or an ohmmeter (x1 scale) with leads touching any 2 stator leads. Make checks between 2 different sets of stator leads.

2) Readings should be equal. If test lamp does not light or if resistance is high, windings are open. *See Fig. 4.*

NOTE: Delta windings on 15SI and 27SI alternators cannot be checked for open with an ohmmeter.

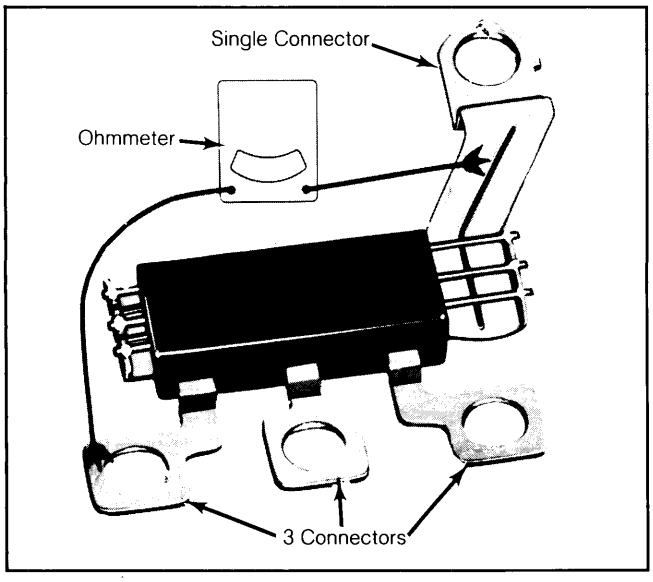
Diode Trio Test

1) With diode trio removed from end frame, connect an ohmmeter to single connector and to 1 of the 3 connectors. *See Fig. 5.* Observe reading, then reverse leads.

2) A good diode trio will give 1 high and 1 low reading. If both readings are the same, replace diode trio. Repeat tests between single connector and each of the 2 connectors.

NOTE: Before replacing diode trio, also check rectifier bridge. Do not use high voltage, such as 110-volt test lamp, when testing diode trio.

Fig. 5: Bench Testing Diode Trio



Test diode trio using an Ohmmeter.

Rectifier Bridge Test

1) Connect an ohmmeter with 1 lead touching grounded heat sink and the other lead touching flat metal on 1 of the 3 terminals. Observe reading and reverse test lead connections. *See Fig. 6.*

2) If both readings are the same, replace rectifier bridge. A good bridge will give 1 high and 1 low reading. Repeat test on all terminals (6 tests with insulated heat sink).

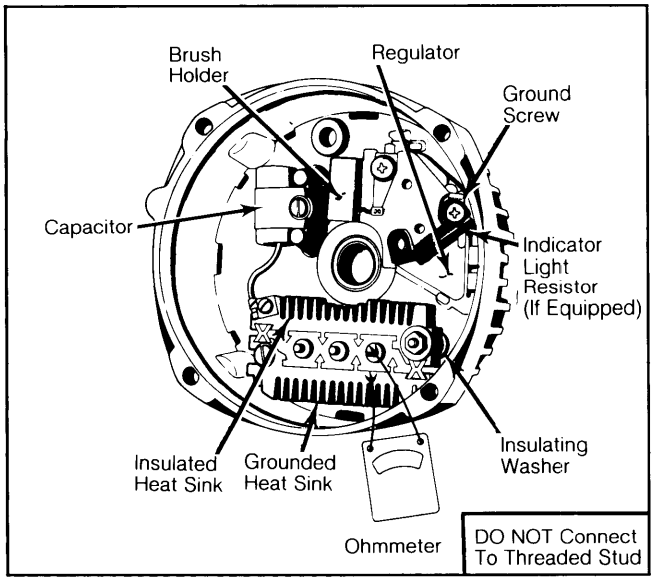
3) Connect test leads to insulated heat sink and 1 edge of the 3 terminals. Observe reading and reverse connections. Repeat test on all terminals (6 tests with insulated heat sink).

4) When all 12 tests have been made, testing is complete. Do not use high voltage, such as 110-volt test lamp to check bridge. Do not replace diode trio or rectifier

DELCO-REMY WITH INTEGRAL REGULATOR (Cont.)

bridge unless at least 1 pair of readings is the same (with leads reversed).

Fig. 6: Bench Testing Rectifier Bridge and Identification of End Frame Components



Observe reading and reverse test lead connections.

Alternator/Regulator Circuit Test

Voltage regulator tester (CTW-1170) must be used for this check. With alternator in vehicle, turn tester off. Plug the on-vehicle testing cable in place on tester. Disconnect regulator connector from alternator. Plug the on-vehicle testing cable in its place. Connect ground lead to alternator case.

Test circuit using steps **2), 3), 4)** and **15)** under instructions listed on tester cover. If proper voltage indication is not obtained or lamps flicker off and on when performing test, regulator must be removed from vehicle for further testing.

REASSEMBLY

1) Fill cavity between retainer plate and bearing ¼ full with lubricant (Delco-Remy 1948791 or equivalent). Assemble bearing and slinger (flat washer on some models) in front housing. Press bearing in with collar that fits over outer race. If bearing retainer plate felt seal is hardened, replace retainer plate.

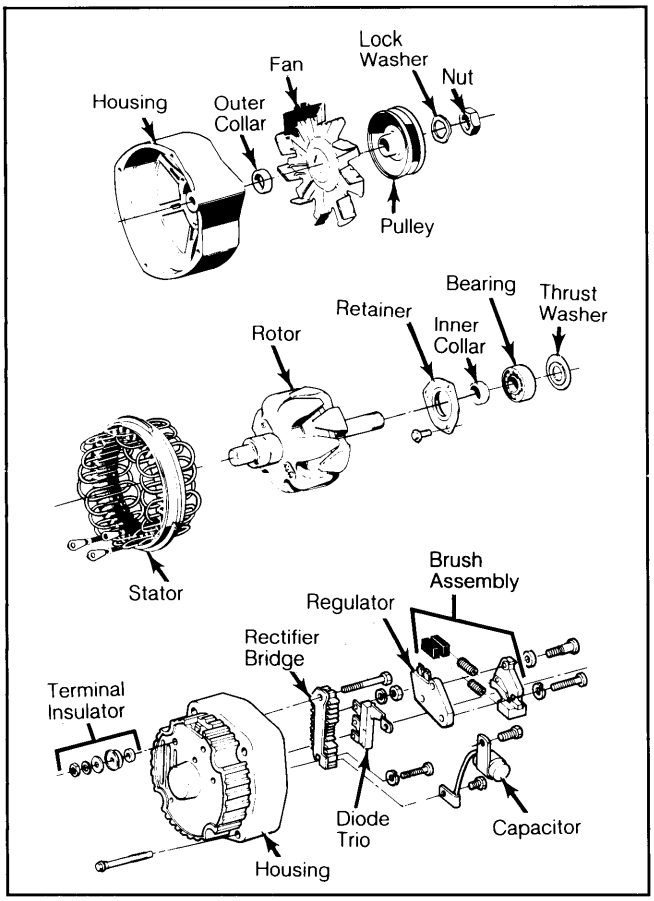
2) Install retainer plate and screws. Press rotor into end frame. Assemble collar, fan, pulley, washer and nut.

3) If rear bearing was removed, support inside of rear housing with hollow cylinder. On 10SI and 27SI models, place flat plate over bearing. Press bearing into housing from outside, until bearing is flush with end frame. On 15SI models, use thin wall tube in space between grease cup and housing to push bearing in until flush with housing. Oil lip of replacement bearing seal, and press seal in with lip away from bearing.

4) Install springs and brushes in brush holder. Install wooden toothpick in hole at bottom of holder to retain brushes. Install voltage regulator. Attach brush holder into rear housing, noting stack-up of parts. Allow toothpick to protrude through hole in rear housing.

5) Install diode trio lead strap attaching screw and washer. Tighten brush holder screws. Position bridge rectifier on rear housing with insulator between heat sink and rear housing.

Fig. 7: Exploded View of Delcotron Alternator Model 10SI



Used on Chevrolet, GMC and Jeep models.

6) Install bridge rectifier and battery terminal screws. Connect capacitor lead to bridge rectifier. Position diode trio on end housing. Install diode trio lead clip screw, making sure insulating washer is over top of diode connector.

7) Install stator on rear housing. Attach stator leads to bridge rectifier terminals. Remove tape covering bearing and join front and rear housings with scribe marks aligned. Install through bolts and tighten. Remove toothpick from brush holder assembly.

ALTERNATOR OUTPUT

Stamped Amperage	Amperage @14V	Rated Output (Engine RPM)
37	[1] 22	2000
42	25	2000
55	30	2000
61	30	2000
63	[2] 32	2000
70	55	2000
80	55	2000
85	[3]	[3]

[1] — Number 1100146 32 amps. at 2000 RPM.
[2] — Number 1100201 22 amps. at 2000 RPM.
[3] — Information not available from manufacturer. Police option.