DELCO-REMY ENCLOSED HOUSING

Chevrolet
GMC
International Harvester

DESCRIPTION

Starter is a 12-volt, 4-pole unit of conventional design and has a solenoid pinion shaft (overrunning clutch) with entire mechanism enclosed within the housing. Field assembly consists of four series coils or combination of series coils with one or more shunt coils. Brush assemblies are completely enclosed within field frame at commutator end so entire starter and drive assembly is protected.

Starter solenoid is flange-mounted on drive end housing and has a compression-type return spring located inside te solenoid case. Starter for diesel engines is longer than others, uses a center bearing and provides minimum 100 RPM cranking speed.

APPLICATION

Vehicle	Delco-Remy Part No.
Chevrolet & GMC	
250"	
"C" & "K" Models	1108778
All Other Models	1108779
292"	
All Models	1108780
305"	
"C" & "K" Models	1109056
All Other Models	1109798
350"	
Gasoline Model	1109052
Diesel Model	1109213
400" & 454"	
All Models	1108776
IHC	
196",304" & 345"	1108278

TESTING

STARTER CRANKING CIRCUIT TESTS

1) With engine at normal operating temperature, ground distributor terminal of coil so engine will not start. Connect voltmeter positive lead to motor terminal on solenoid and ground negative lead. Crank engine and read voltmeter; if cranking speed is normal and voltage is 9 volts or more, system is satisfactory. If cranking speed is below normal and voltage is 9 volts or greater, starter is defective.

2) If starter turns engine slow with 9 volts or less, test voltage across solenoid switch contacts. Connect a 12 volt meter negative lead to solenoid motor terminal and positive lead to battery terminal of switch. Crank engine and immediately turn voltmeter switch to low scale, take reading, then turn switch back to high scale before stopping engine. Voltage drop must not exceed .2 volt for contacts to be satisfactory.

SOLENOID WINDINGS TEST

NOTE – *Tests are performed with all leads disconnected. Complete tests in minimum amount of time to prevent solenoid from overheating.*

Hold-In Winding – Connect an ammeter, voltmeter and battery into starter circuit. *(see Fig. 1).* Use a carbon pile to decrease battery voltage to 10 volts. Ammeter should read 14.5-16.5 amperes. If amperage is above 16.5, then winding is shorted or grounded. If amperage draw is below 14.5 amperes, excessive resistance is indicated.

Both Windings In Parallel – Remove jumper wire from motor terminal of solenoid and readjust resistance so battery voltage is 10 volts. Current draw should be 40.5-47.5 amperes. If not within specifications replace solenoid.

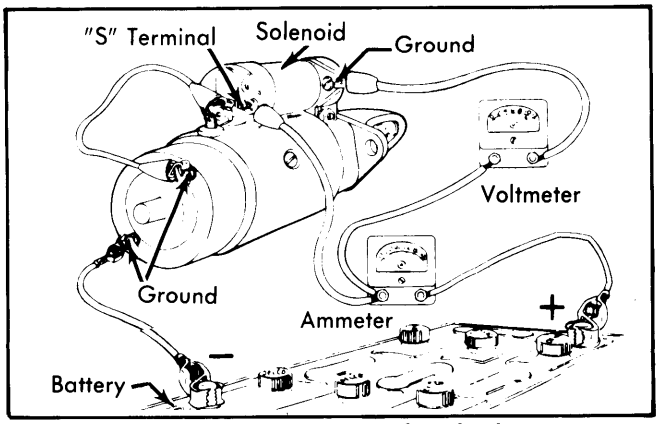

Fig. 1 Test Connections for Checking Solenoid Winding

STARTER NO LOAD TEST

To perform test, connect a tachometer, ammeter and voltmeter into starter circuit *(see Fig. 2).* Adjust carbon pile to voltage indicated in Delco-Remy Starter Specifications, then read current draw and armature speed to ensure they are within specifications. **CAUTION** – *Do not apply voltage greater than specified as excessive voltage may cause armature to throw windings because of excessive speed.*

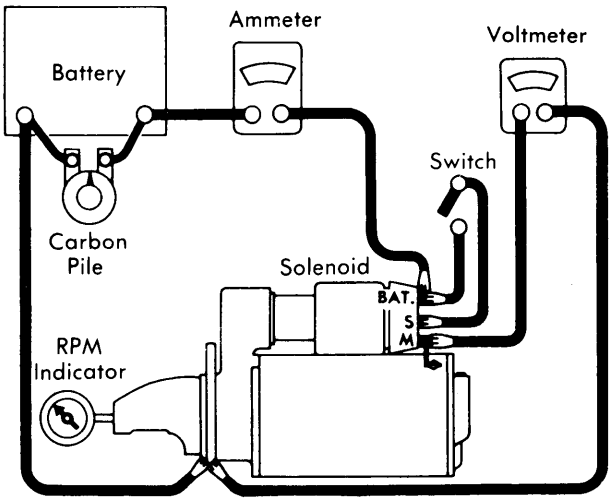

Fig. 2 Test Connections for Checking Starter No Load

DELCO-REMY STARTER SPECIFICATIONS

Delco-Remy Number	No Load Test		
	Amps. ①	RPM	Volts
1107709	50-80	5,500-10,500	9
1108776	65-95	7,500-10,500	9
1108778	50-80	5,500-10,500	9
1108779	50-80	5,500-10,500	9
1108780	50-80	3,500-6,000	9
1109026	65-95	7,500-10,500	9
1109052	65-95	7,500-10,500	9
1109056	50-80	5,500-10,000	9
1109798	50-80	5,500-10,500	9

① – Includes the solenoid.

DELCO-REMY ENCLOSED HOUSING (Cont.)

STARTER SPECIFICATIONS

Brush Spring Tension	35 oz.
Rotation	Clockwise at Pinion End
Pinion-to-Housing Clearance	①.010-.140"

① – Measured between pinion and pinion stop with pinion in engaged position.

OVERHAUL

DISASSEMBLY

1) Disconnect field lead strap from solenoid by taking out terminal screw. Remove two through bolts, withdraw commutator end frame and field frame by pulling these parts off the armature. Remove thrust washer from commutator end of armature shaft.

2) Pull out brush holder pivot pin and remove two brush holders and spring as an assembly. Remove brushes by taking out screws attaching leads and brushes to holder.

3) Remove two solenoid attaching screws and remove solenoid from drive housing. To remove solenoid cover for switch inspection, remove nuts and insulating washers from solenoid "S" and "BAT" terminals, remove cover.

4) Remove shift lever fulcrum bolt, remove shift lever, plunger, and return spring from end housing. Withdraw armature assembly. Remove thrust collar from pinion end of armature shaft.

5) To remove drive assembly from armature shaft, install piece of correct size tubing over end of shaft and against pinion stop retainer, tap retainer toward armature to uncover snap ring. Remove snap ring from groove in shaft, then slide retainer and drive assembly off shaft.

CLEANING

Clean all parts by wiping with clean cloth. Do not clean armature, field coils, or drive assembly in any type of grease dissolving solvent as this will damage insulation and wash lubricant out of drive assembly.

PARTS REPLACEMENT & TESTING

Armature – Test armature for shorted coils with a growler. Check for grounded coils with a 110 volt test lamp. Place one test lead on armature core or shaft, and other test lead on commutator. Lamp should not light. If lamp lights, armature is grounded and should be replaced. Inspect commutator. If commutator is worn, out of round, or has high insulation, turn down commutator in a lathe, undercut insulation 1/32" deep and square across entire width, sand commutator lightly with 00 grade sandpaper and clean out slots carefully.

CAUTION – *Some starters have molded-type commutator, and insulation must not be undercut on these models as this may cause serious damage to commutator.*

Field Coils – Check with 110 volt test light. Place one test lead on field coil terminal strap, touch other test lead to field coil brush lead (check series coils and shunt coils separately at appropriate terminals). Lamp should light. If lamp does not light, coils are open. Check for grounds by placing one test lead on field armature strap, touch other lead to armature core or shaft. **CAUTION** – *Shunt coil ground lead must be disconnected and all field terminals insulated from frame when making this test.* If lamp lights, one or more coils are grounded.

Brushes, Springs, & Holders – Replace brushes if worn to one-half of original length, or if oil-soaked or pitted. Check brush spring tension and replace springs if weak or distorted. Deformed or bent brush holders can be replaced by service units which are installed with screws and nuts.

Drive & Pinion Assembly – Pinion should turn freely in overrun direction and should not slip in drive direction. Check spring for correct tension and drive collar for wear (these parts can be removed for replacement by forcing collar toward clutch and removing lock ring from end of tube). Replace drive assembly if pinion teeth are worn, chipped, or cracked.

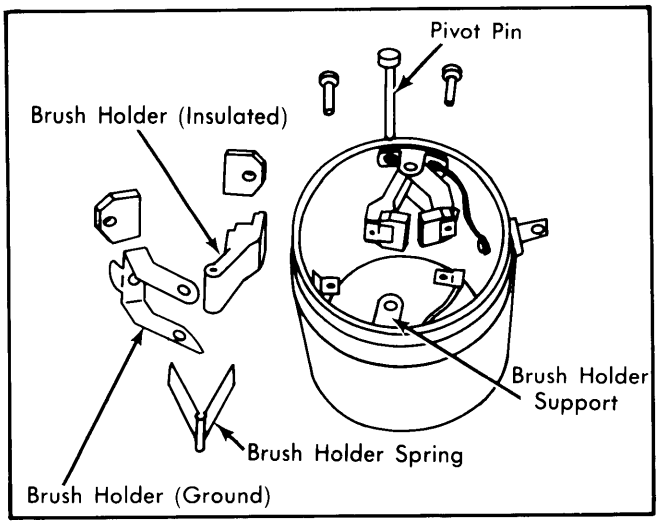

Fig. 3 Brush Holder and Assembly

Armature Shaft Bushings – Inspect armature shaft bearing surfaces and check for wear by noting sideplay with shaft inserted in bushings. Drive end bushing can be replaced. Replace commutator end plate assembly if bushing is worn.

Pinion Clearance – Connect an electrical source of 6 volts between solenoid "S" terminal and ground. **CAUTION** – *Do not use more than 6 volts or motor will operate.* After energizing solenoid, push pinion away from stop retainer as far as possible and use feeler gauge to check clearance between pinion and retainer. If clearance is not within specifications disassemble motor and check for defects.

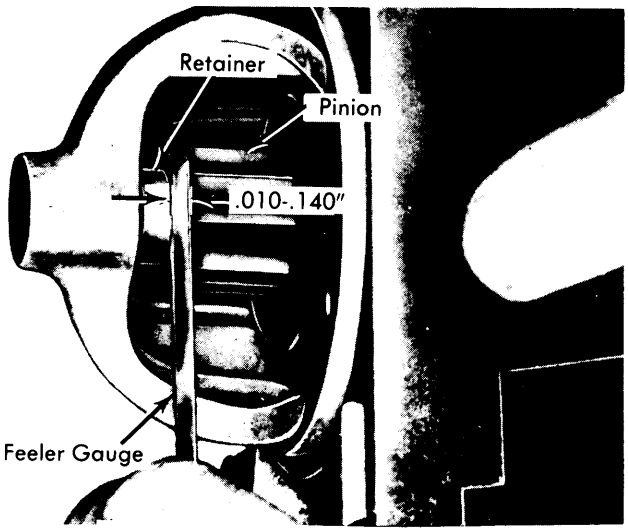

Fig. 4 Checking the Pinion End Play

DELCO-REMY ENCLOSED HOUSING (Cont.)

REASSEMBLY

1) Lubricate armature shaft with silicone lubricant or several drops of SAE 10 engine oil, install drive assembly on shaft, install retainer with cupped side out or away from pinion, install lock ring in shaft groove, install thrust collar with shoulder against lock ring. Position retainer on lock ring by using two pliers at opposite points to squeeze retainer and thrust collar together against lock ring.

2) Assemble brush holders and install brushes, connect field leads to proper brushes, check assemblies for free movement.

3) Assemble solenoid plunger on shift. Lubricate drive housing bushing with silicone lubricant or few drops of SAE 10 engine oil. Install armature and drive assembly in drive housing with shift lever engaged in drive collar, install shift lever pin. Coat both sides of solenoid flange which extends down between drive housing and field frame with suitable sealer (No. 1050026), place return spring over plunger and install solenoid, tighten solenoid attaching screws securely.

4) Align field frame dowel with dowel hole in drive housing. Install field frame over armature and against end housing. **CAUTION** — *Lift brushes up over commutator as field frame is installed to prevent damage to brushes.*

5) Install thrust washer (leather brake washer) on end of armature shaft. Lubricate commutator end frame bushing with silicone lubricant or few drops of SAE 10 engine oil, install end frame, install through bolts and tighten securely.

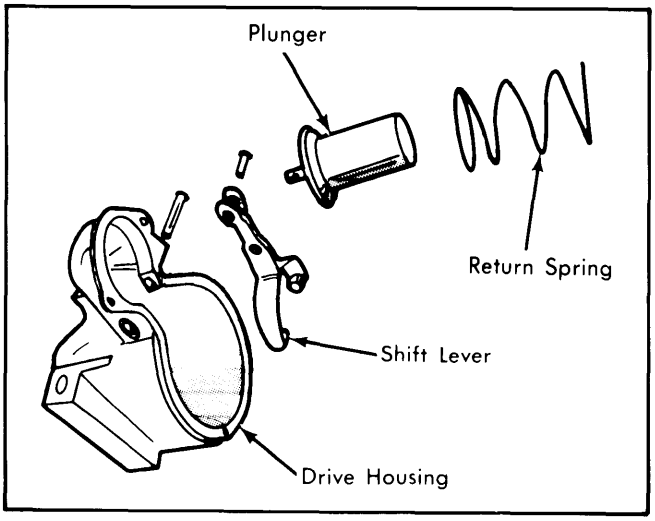

Fig. 5 Disassembled View of Shift Lever Assembly

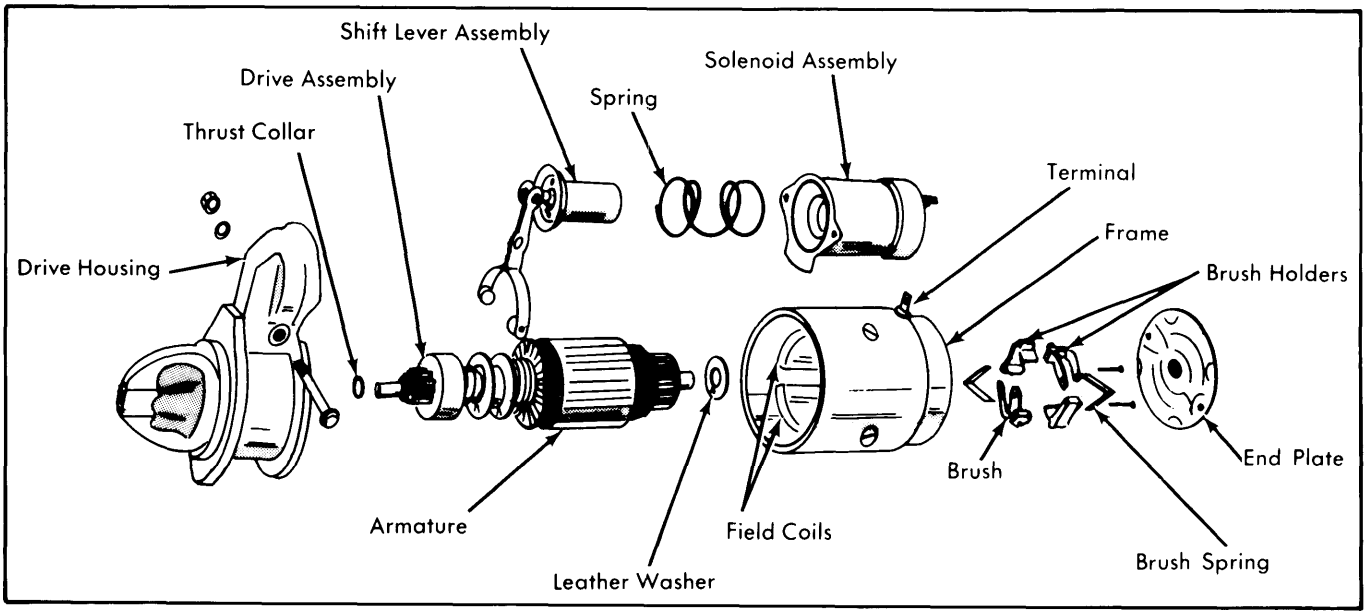

Fig. 6 Exploded View of Delco-Remy Enclosed Housing Starter Assembly (Diesel Similar)