DELCO-REMY ENCLOSED HOUSING

General Motors

DESCRIPTION

Starting motors are 12 volt units with enclosed solenoid, shift lever and overrunning clutch drive. Internal field coil circuits are wired differently for various engine sizes depending on cranking loads.

TESTING

STARTER CRANKING CIRCUIT TESTS

1) With engine at normal operating temperature, disconnect HEI distributor wire harness connector or high voltage coil wire on standard ignition. 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 nine volts or more, system is satisfactory. If cranking speed is below normal and voltage is nine 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 overheating solenoid.*

Hold-In Winding – Connect test equipment as shown in *Fig. 1*. Use carbon pile to decrease battery voltage to 10 volts. Ammeter should read 14.5 to 16.5 Amps. If amperage is above 16.5 Amps., winding is shorted or grounded. Amperage draw below 14.5 Amps. indicates excessive resistance.

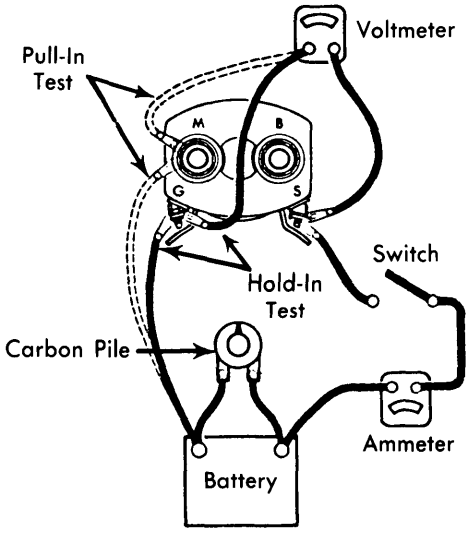

Fig. 1 Solenoid Winding Test Connections

Pull-In & Hold-In Winding – Ground the "MOT" or "M" terminal and connect a 10 volt source (in series with ammeter) to solenoid switch terminal and ground. Current draw should be 40.5-47.5 amps.

STARTER NO LOAD TEST

To perform test, connect starter as shown in *Fig. 2*. To obtain voltage specified in Delco-Remy Starter Specifications, adjust carbon pile. Then read current draw and armature speed and compare these readings with specifications.

CAUTION – *Do not apply voltage greater than specified; excessive voltage may cause armature to throw windings because of excessive speed.*

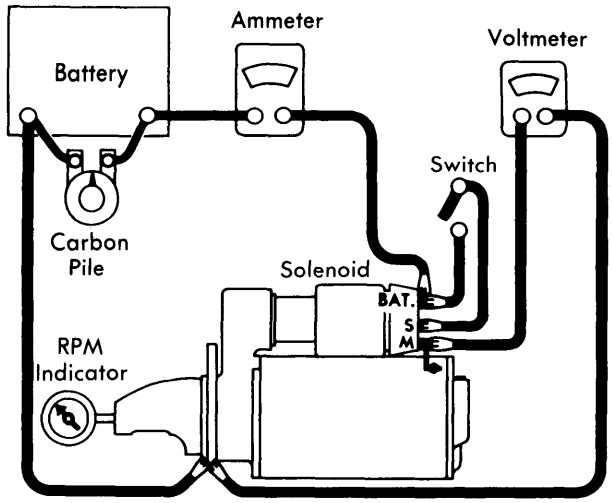

Fig. 2 Starter No Load Test Connections

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 brushes and leads 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 and 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 a piece of correct size tubing over end of shaft and against pi-

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nion 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 cloths. Do not clean armature, field coils, or drive assembly in any type of grease dissolving solvent (will damage insulation and wash lubricant out of drive assembly).

DELCO-REMY STARTER SPECIFICATIONS

Delco-Remy Number	No Load Test		
	Amps.	RPM	Volts
1108415	35-75	6,000-9,000	9
1108758	55-80	3,500-6,000	9
1108759	65-95	7,500-10,500	9
1108764	50-80	5,500-10,500	9
1108765	55-80	3,500-6,000	9
1108771	50-75	6,500-10,000	9
1108772	50-75	6,500-10,000	9
1108774	50-80	5,500-10,500	9
1108779	50-80	5,500-10,500	9
1108790	55-80	3,500-6,000	9
1108794	65-95	7,500-10,500	9
1108796	65-95	7,500-10,500	9
1108797	50-80	5,500-10,500	9
1108799	50-80	5,500-10,500	9
1109024	65-95	7,500-10,500	9
1109026	65-95	7,500-10,500	9
1109027	65-95	7,500-10,500	9
1109052	65-95	7,500-10,500	9
1109056	50-80	5,500-10,500	9
1109059	65-95	7,500-10,500	9
1109412	50-75	6,500-10,500	9
1109414	50-75	6,500-10,500	9

PARTS REPLACEMENT & TESTING

Armature – 1) 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.

2) Inspect commutator. If commutator is worn, out-of-round, or has high insulation, turn down commutator in a lathe. Undercut insulation $\frac{1}{32}$" deep and square across entire width, sand commutator lightly with 00 sandpaper and clean out slots carefully.

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

Field Coils – 1) Check with a 110 volt test light. Place one test lead on field coil terminal strap, and touch other test lead to field coil brush lead. NOTE – *Check series coils and shunt coils seperately at appropriate terminals.* Lamp should light.

2) If lamp does not light, coils are open. Check for grounds by placing one test lead on field terminal strap, and touch other test 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 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.

Brush Spring Tension

Application	Tension
All	35 ozs.

PINION CLEARANCE CHECK

1) Connect an electrical source of approximately 6 volts between solenoid "S" terminal and ground. CAUTION – *Do not use more than 6 volts or motor will operate.* As a further precaution, connect a heavy jumper wire from solenoid motor terminal to ground.

2) After energizing solenoid, push pinion away from stop retainer as far as possible and use feeler gauge to check clearance between pinion and retainer. Clearance should be .010"-.140". NOTE – *Pinion clearance is not adjustable. If clearance is not within specifications, motor must be disassembled and checked for defects.*

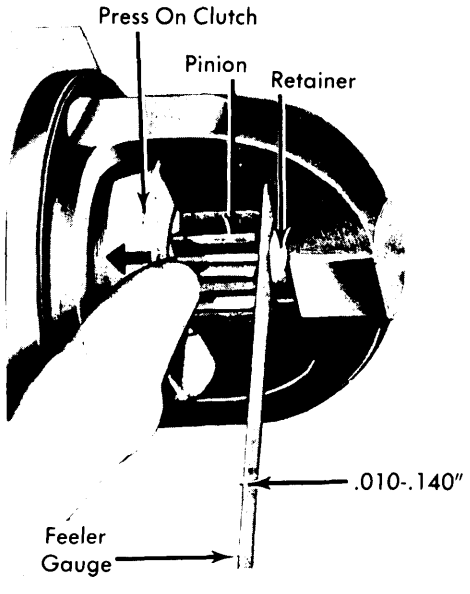

Fig. 3 Checking Pinion End Play

Overrunning Clutch – Clutch pinion should turn freely in one direction only. Check pinion teeth for chipped, cracked or excessive wear. Chipped teeth may indicate a defective ring

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gear. Test overrunning clutch for slipping while still attached to armature. Wrap armature with a shop towel and clamp in suitable vise. With a 15/16" 12 point deep socket and torque wrench, clutch should not slip up to 50 ft. lbs. If it slips, replace clutch.

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

REASSEMBLY

1) Lubricate armature shaft with silicone lubricant or a few 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.

2) Position retainer on lock ring by using two pliers at opposite points to squeeze retainer and thrust collar together against lock ring. Assemble brush holders and install brushes. Connect field leads to proper brushes. Check assemblies for free movement.

3) Assemble solenoid plunger on shift lever. Lubricate drive housing bushing with silicone lubricant or a 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).

4) Place return spring over plunger and install solenoid, tighten solenoid attaching screws securely. 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 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 a few drops of SAE 10 engine oil. Install end frame and through bolts then tighten securely.

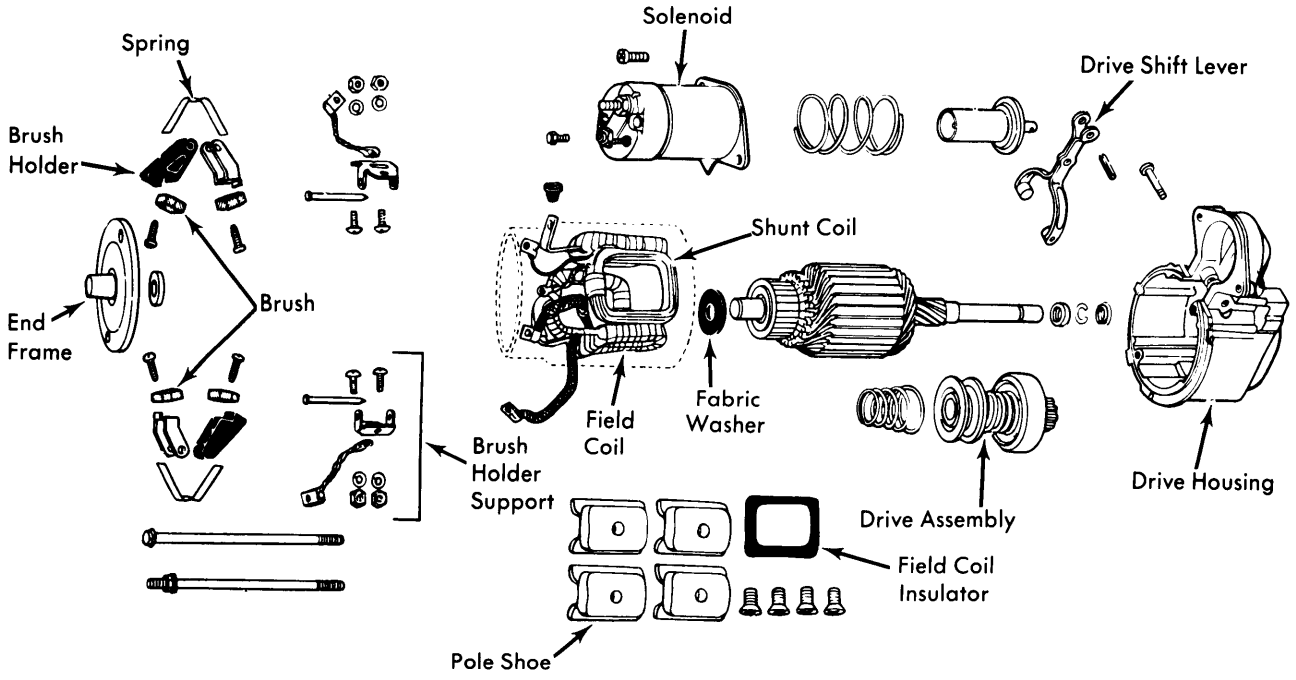

Fig. 4 Exploded View of Starter Motor Assembly