DELCO-REMY

General Motors

DESCRIPTION

Starting motors are all 12 volt units with enclosed solenoid, shift lever and overrunning clutch. Starting motor circuits are different, depending on speed and load requirements. Three sizes of starter motors are used, 5 MT, 10 MT and 25 MT. The 10 MT and 25 MT starters differ only in size and capacity. The 5 MT uses integral construction of field coils, pole shoes and frame.

TESTING

SOLENOID WINDINGS TEST

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

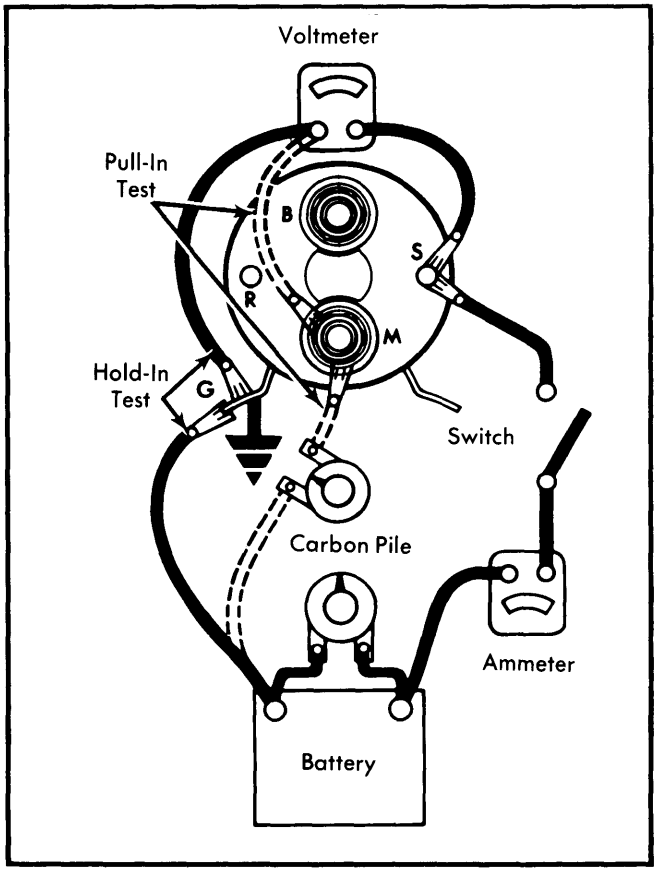

Fig. 1 Solenoid Winding Test Connections

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.

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.*

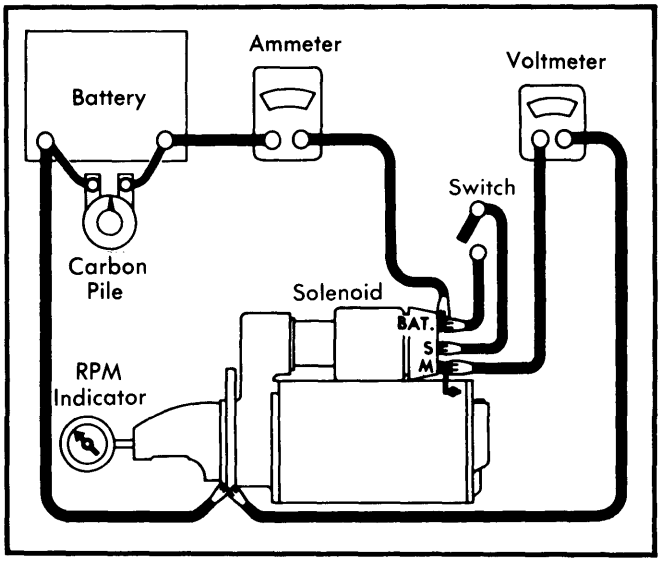

Fig. 2 Starter No Load Connections

OVERHAUL

DISASSEMBLY

1) Disconnect field lead strap from solenoid by taking out terminal screw. Remove through bolts, withdraw commutator end frame and field frame (diesel only, remove insulator) 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 brush holders and spring as an assembly. Remove brushes by taking out screws attaching brushes and leads to holder.

3) Remove 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. ①	RPM	Volts
1108759	65-95	7,500-10,500	9
1108774	60-85	6,500-10,100	10.6
1109052	65-95	7,500-10,500	10.6
1109056	50-80	7,500-11,400	10.6
1109059	65-95	7,500-10,500	10.6
1109061	60-85	6,800-10,300	9
1109062	65-95	7,500-10,500	9
1109064	60-85	6,800-10,300	9
1109065	65-95	7,500-10,500	9
1109067	65-95	7,500-10,500	9
1109070	65-95	7,500-10,500	9
1109072	65-95	7,500-10,500	9
1109213	40-130	8,000-13,000	9
1109521	45-75	6,500-9,700	9
1109523	45-70	7,000-11,900	9
1109524	45-70	7,000-11,900	9
1998204	60-85	6,800-10,300	9
1998205	65-95	7,500-10,500	9

① – Includes solenoid.

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 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

Connect an electrical source of 12 volts between solenoid "S" terminal and ground. Energize solenoid, release and push away from stop retainer as far as possible. Use feeler gauge and 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.*

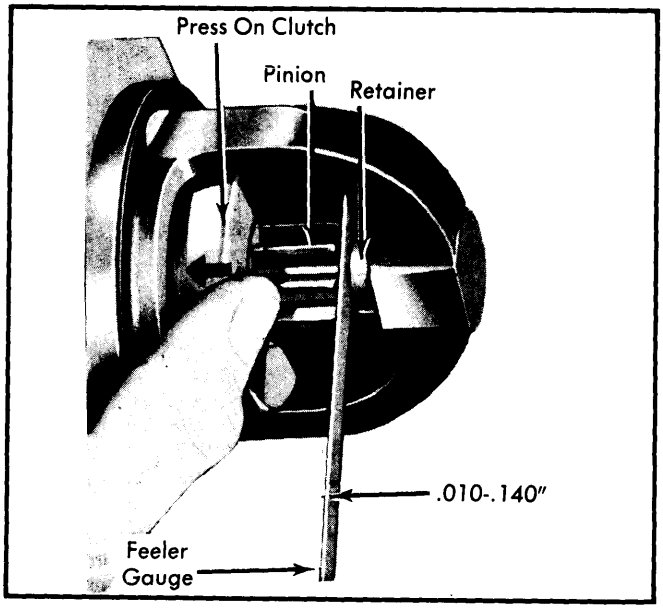

Fig. 3 Checking Pinion End Play

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 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.

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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. Install center bearing, diesel only, with bearing toward armature winding.

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.

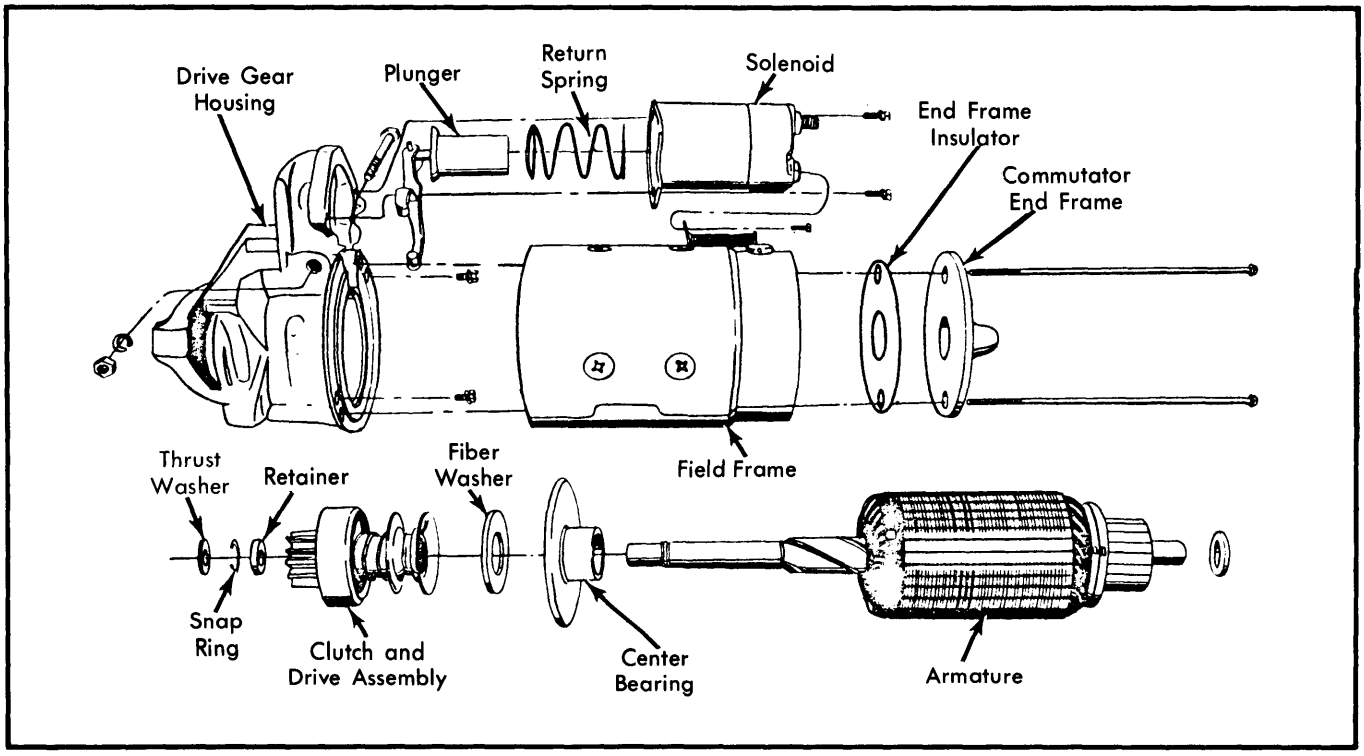

Fig. 4 Exploded View of Starter Motor Assembly – Delco-Remy Diesel Series MT 25 Series 10 MT, (Same Exc. Center Bearing), Series 5 MT (Similar)