DELCO-REMY

American Motors (4 Cylinder)
General Motors (All Models)

DESCRIPTION

Starting motors are all 12 volt units with enclosed solenoid, shift lever and overrunning clutch. Starting motor circuits are different, depending on load and speed requirements. Five sizes of starter motors are used, 5MT, 10MT, 20MT, 25MT and 27MT. The only difference between the 10MT and the 20MT, 25MT and 27MT is the longer length of the latter 3 to incorporate an armature shaft center support bearing. The 5MT 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.*

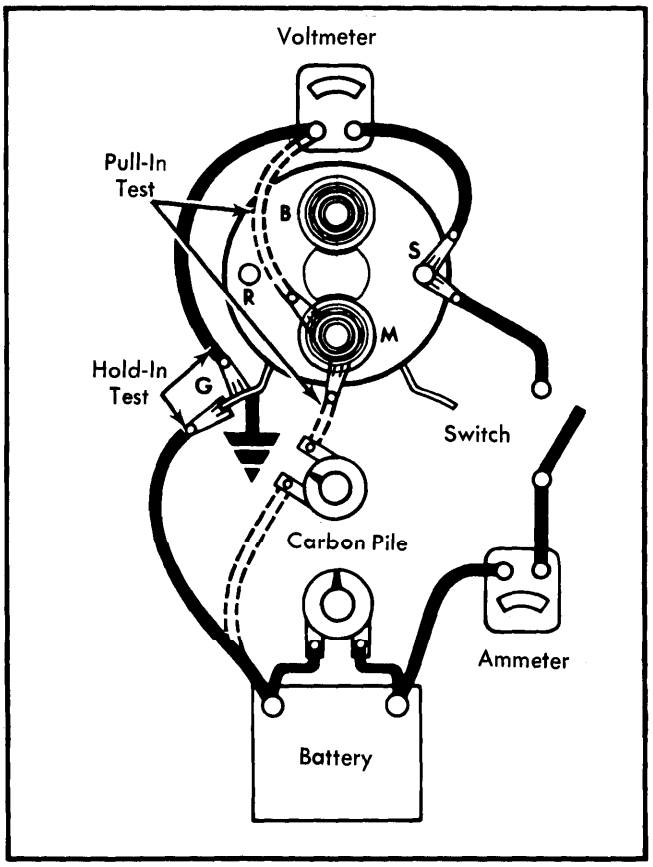

Fig. 1 Solenoid Winding Test Connections

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.*

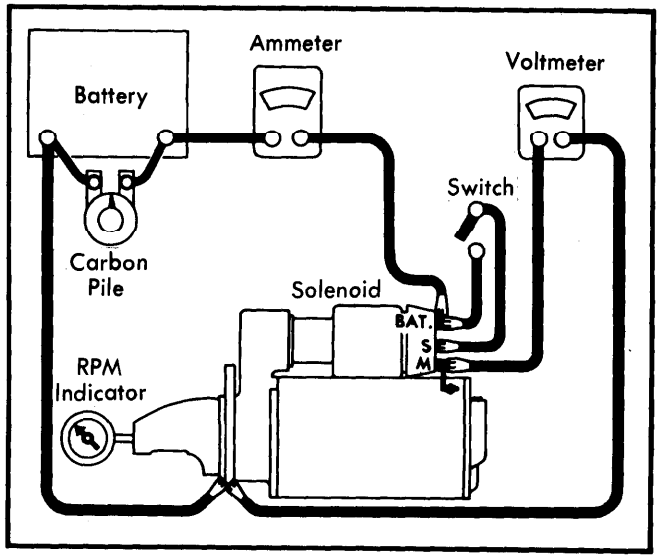

Fig. 2 Starter No Load Connections

OVERHAUL

DISASSEMBLY

1) Remove screw from field coil connector and solenoid mounting screws. Rotate solenoid 90° and remove, along with plunger return spring. Remove through bolts, commutator end frame (diesel only, remove insulator) and washer.

2) Remove field frame assembly from drive gear housing. (On diesel starter, armature remains in drive end frame.)

3) Remove snap ring that holds shift lever pivot pin using snap ring pliers, and remove pivot pin from drive housing. (On diesel only, remove center bearing screws and drive gear housing from armature shaft. Shift lever and plunger will now fall away from clutch.)

4) Remove plunger and shift lever assembly and armature assembly with overrunning clutch from drive end housing.

5) Remove thrust washer from armature shaft. Slide a 5/8" deep socket over shaft against retainer as a driving tool. Tap tool to move retainer off snap ring. Remove snap ring from groove in shaft. If snap ring is distorted, it must be replaced upon reassembly.

6) Remove retainer, clutch assembly, assist spring and retainer from armature shaft. (On diesel only, remove fiber washer and center bearing.)

7) Shift lever and plunger may be disassembled by removing the roll pin.

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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
1108415	35-75	6,000-9,000	9
1108771	50-75	6,500-10,000	9
1108772	50-75	6,500-10,000	9
1108790	55-80	3,500-6,000	9
1109052	65-95	7,500-10,500	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	40-140	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
1109526	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 rough, worn or has protruding insulation, turn down commutator in a lathe. Do not turn to less than 1.650". Sand commutator lightly with commutator paper 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. Disconnect field coil ground connections. Connect one test lead to field frame and the other lead to field connector. If light comes on, the field coils are grounded.

2) Connect test light to ends of field coils. If light does not come on, field coils are open.

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.

PINION CLEARANCE CHECK

Connect an electrical source of 12 volts between solenoid "S" terminal and ground. Energize solenoid, release and push pinion 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.*

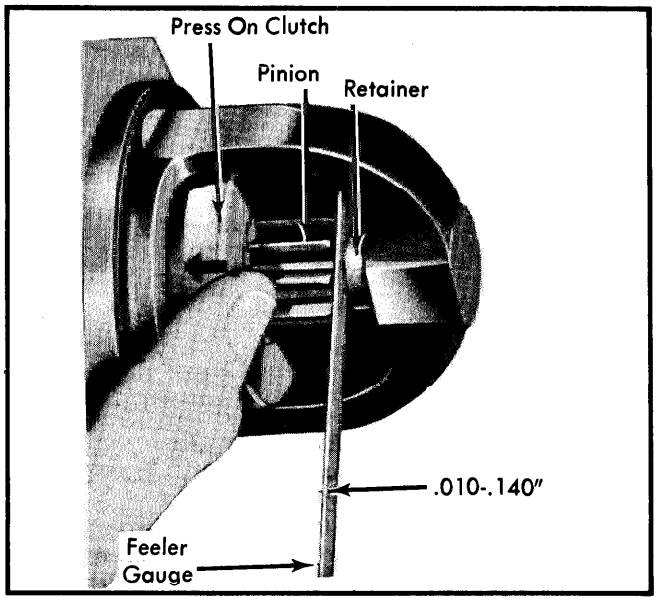

Fig. 3 Checking Pinion End Play

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.

REASSEMBLY

1) Lubricate armature shaft with silicone lubricant and install center bearing (diesel only) with bearing toward armature winding. Install fiber washer on armature shaft. Slide assist spring onto armature shaft with assist spring retainer in large end of spring.

2) Slide clutch assembly onto armature shaft with pinion away from armature. Slide retainer onto shaft with cupped side facing shaft end. Install thrust washer and snap ring onto shaft.

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3) Position retainer and thrust washer with snap ring in between. Using two pliers, grip retainer and thrust washer and squeeze until snap ring is forced into retainer and is held securely in armature shaft groove.

4) Lubricate drive gear housing bushing. Engage shift lever yoke with clutch and slide complete assembly into drive gear housing. Install the center bearing screws (diesel only) and the shift lever pivot bolt and tighten. Install solenoid assembly on drive gear housing.

5) Apply sealer (1050026 or equivalent) to solenoid flange where field frame contacts it. Position field frame against drive gear housing on alignment pin, being careful not to damage brushes. Lubricate commutator end frame bushing with lubricant (1960954 or equivalent).

6) Install washer on armature shaft and slide end frame onto shaft. Install through bolts and tighten. Connect field coil connector to solenoid terminal. Check pinion clearance.

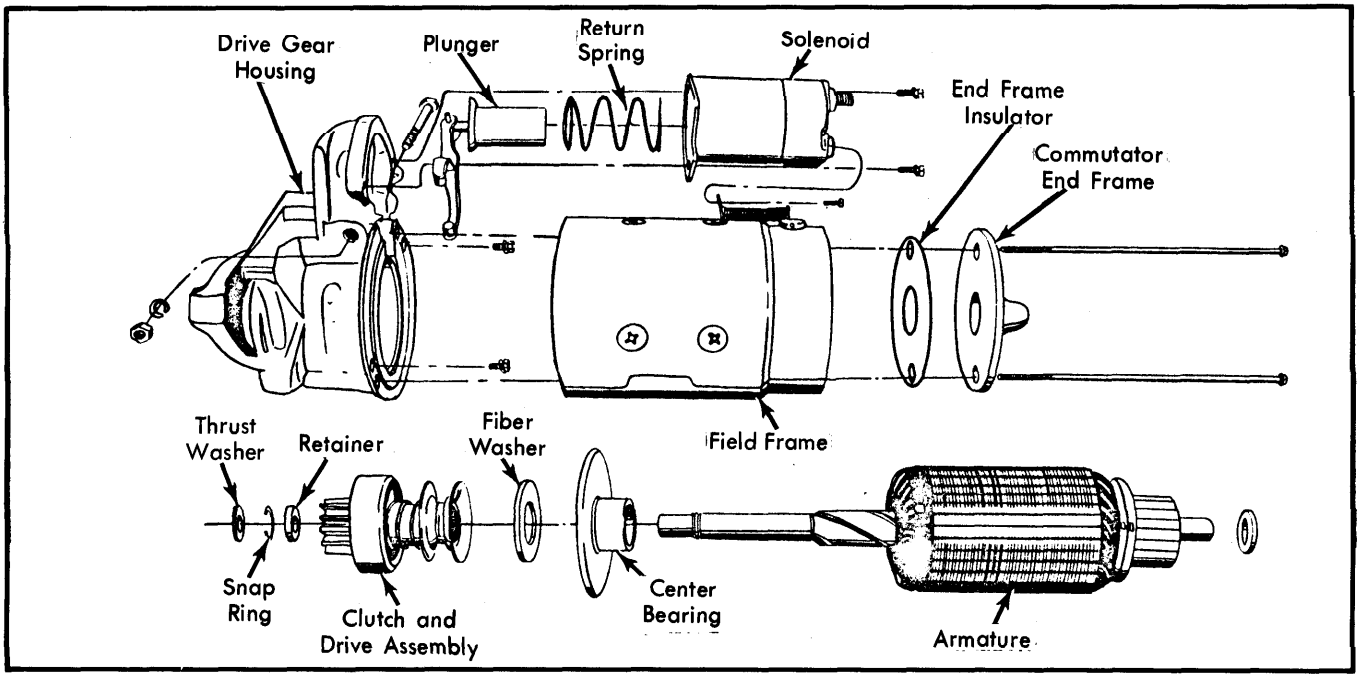

Fig. 4 Exploded View of Delco-Remy Diesel Starter Motor Assembly (20MT, 25MT & 27MT)

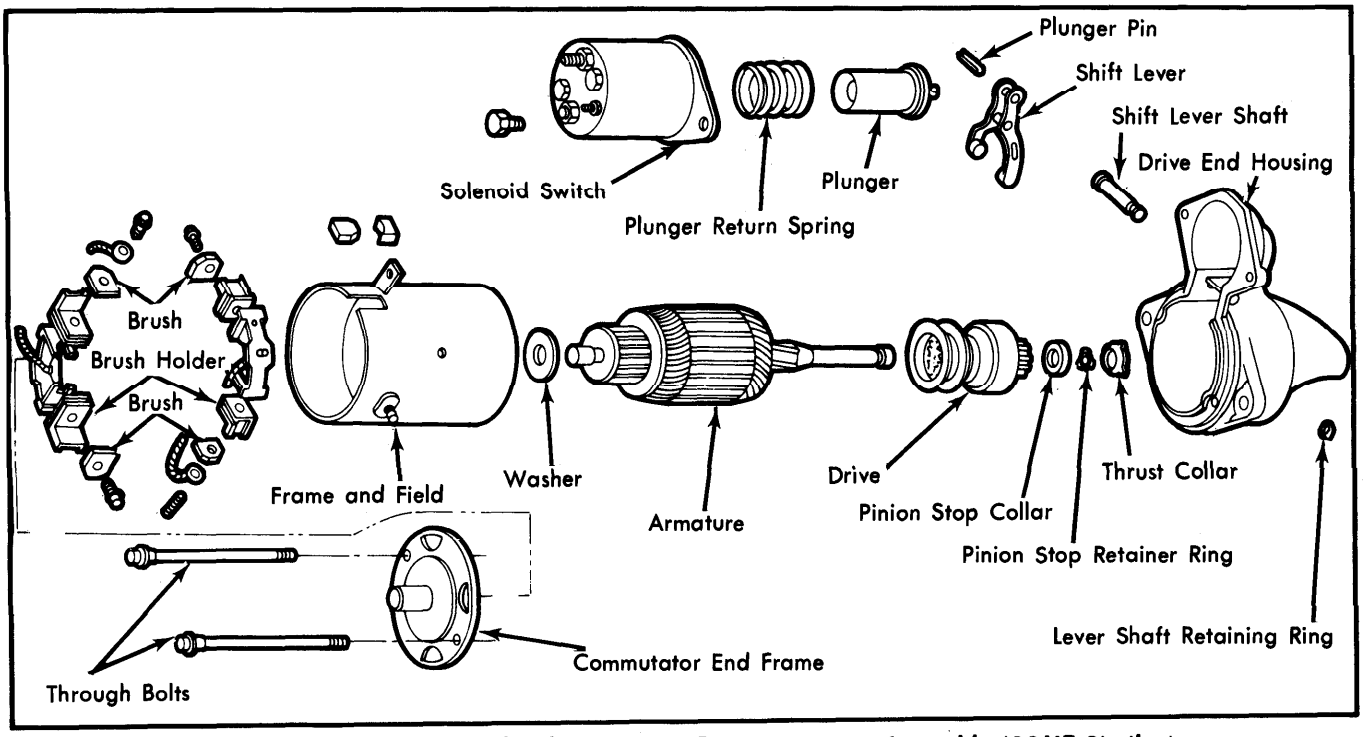

Fig. 5 Exploded View of Delco-Remy 5MT Starter Motor Assembly (10MT Similar)