

DELCO-REMY ENCLOSED HOUSING

**Chevrolet
GMC
Jeep (4-Cylinder Only)**

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 the solenoid case. Jeep models use the 5MT starter. All others except diesel Chevrolet and GMC models use the 10MT starter. Diesel models use the 20MT starter, which differs only in that it uses a center bearing.

Jeep "CJ" and Scrambler models with 4-cylinder engine and automatic transmission have a starter motor relay, which is energized when ignition key is in "START" position and transmission selector lever is in either "NEUTRAL" or "PARK" position. Battery voltage is then applied to pull-in and hold-in windings.

APPLICATION

Vehicle	Delco-Remy Part No.
Chevrolet & GMC	
4.1L (250")	
"C" & "K" Models	1108778
All Other Models	1108779
4.8L (292")	
All Models	1108780
5.0L (305")	
"C" & "K" Models	1109056
All Other Models	1109798
5.7L (350")	
Gasoline Models	1109052
Diesel Models	1109216
7.4L (454")	
All Models	1108776
Jeep	
2.5L (151")	1109526

TESTING

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.

NOTE — On Jeep 4-cylinder engines, specifications are 15-20 amps. at 10 volts for hold-in windings; 20-30 amps. at 5 volts for pull-in windings.

Both Windings in Parallel — Ground the "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.

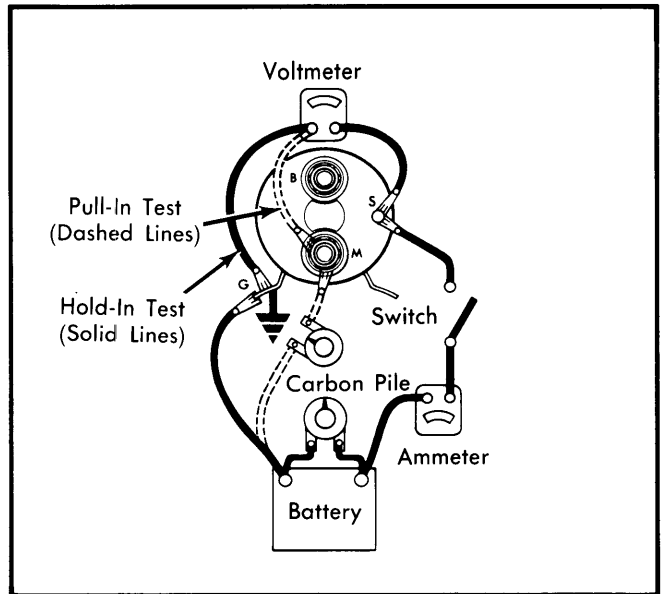


Fig. 1 Connections for Testing Solenoid Windings

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 due to excessive speed.

NOTE — Low free speed and high current draw indicates too much friction, shorted armature, or grounded armature or fields. Failure to operate with high current draw indicates a direct ground in terminal or fields or frozen bearings. Failure to operate with no current draw indicates an open field, open armature coils, or broken brush springs, worn brushes, or high commutator insulation. If no-load speed is low and there is low current draw, suspect high internal resistance due to poor connection, defective leads, or dirty commutator. A high free speed and high current draw usually indicates shorted fields.

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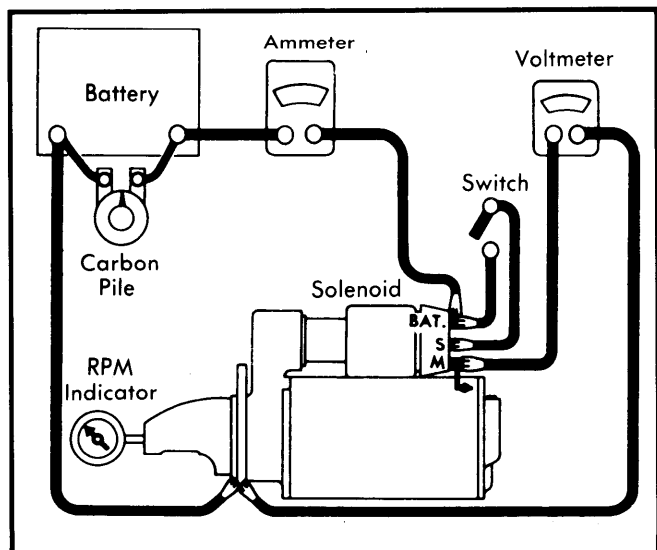


Fig. 2 Connections for No Load Test

DELCO-REMY STARTER SPECIFICATIONS			
Delco-Remy Number	No Load Test		
	Amps. ①	RPM	Volts
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
1109052	65-95	7,500-10,000	9
1109056	50-80	5,500-10,000	9
1109216
1109526	45-70	7,000-11,900	9
1109798	50-80	5,500-10,500	9

① — Includes the solenoid.

OVERHAUL

DISASSEMBLY

- 1) Disconnect field coil connector from solenoid motor terminal. On diesel models, remove solenoid mounting screws and rotate solenoid 90° and remove along with solenoid plunger spring.
- 2) Remove 2 through bolts, commutator end frame, field frame assembly, and washer. On diesel models, remove insulator. On gasoline models, remove armature assembly from drive housing and thrust collar from armature shaft.
- 3) On diesel models, remove shift lever pivot bolt, center bearing screws and drive gear housing from armature shaft. Shift lever and plunger assembly will now fall away from starter clutch.
- 4) Slide a 5/8" deep socket over pinion shaft and with a hammer, strike the socket against the retainer to drive the retainer off the snap ring. Remove snap ring from groove in armature shaft.
- 5) On diesel models, remove retainer, clutch assembly, fiber washer and center bearing. Remove roll pin and remove shift

lever and plunger. On gasoline models, roller clutches are serviced as an assembly only.

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.

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. If lamp lights, 1 or more coils are grounded.

CAUTION — Shunt coil ground lead must be disconnected and all field terminals insulated from frame when making this test.

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.

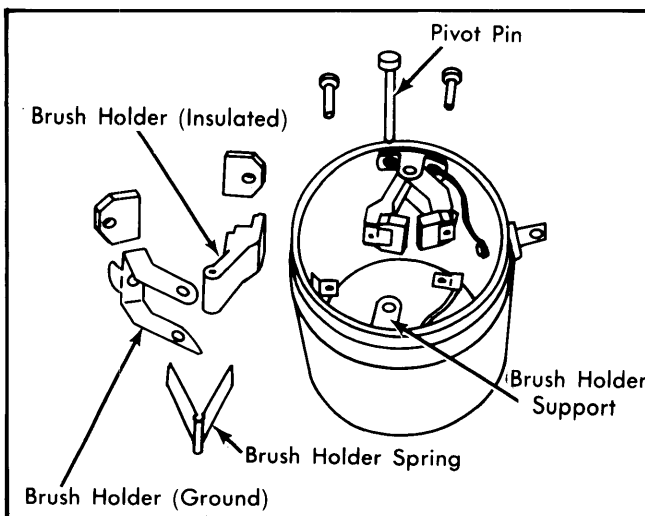


Fig. 3 Brush Holder and Assembly

Starters

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Overrunning Clutch Slippage — With clutch attached to armature, wrap the armature in a shop towel and place in a vise. Using a $1\frac{5}{16}$ " 12 point deep socket and torque wrench, place socket on clutch and turn counterclockwise. The clutch should not slip with up to 50 ft. lbs. of torque applied. If it slips, replace clutch.

Pinion Clearance — Disconnect motor field coil connector and insulate it carefully. Connect a battery from the solenoid switch terminal to solenoid frame. Momentarily flash a jumper lead from motor terminal to solenoid frame. This shifts pinion into cranking position. Push pinion back toward commutator end to eliminate slack. Measure distance between pinion and pinion stop. When installing starter, check clearance between pinion and flywheel ring gear teeth. Insert gauge (.200" diameter wire, about 3" long, with a $\frac{1}{4}$ to $\frac{1}{2}$ " 90° bend in end) between pinion tooth and ring gear. Center pinion tooth between flywheel teeth when making measurement.

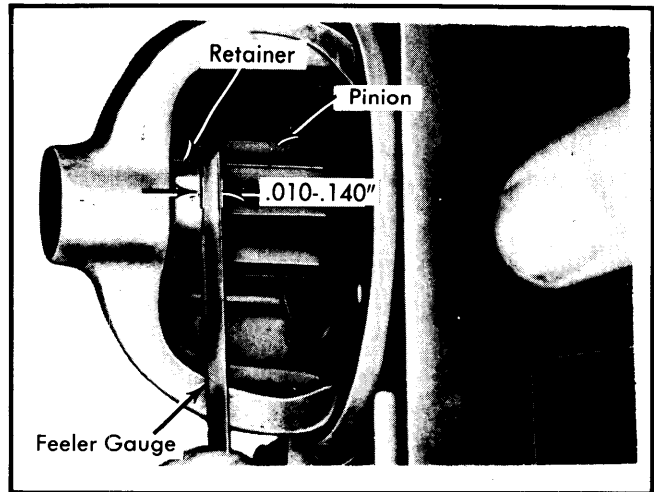


Fig. 4 Checking Pinion-to-Housing Clearance

Pinion Clearance	
Application	Clearance
Pinion-to-Housing	① .010-.140"
Pinion-to-Flywheel Clearance200"
① — Measured between pinion stop (retainer) with pinion in engaged position.	

lubricant and install center bearing, fiber washer and clutch assembly onto armature, with pinion away from armature. Slide retainer onto shaft and install snap ring and thrust washer.

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

3) On all models, lubricate drive gear housing bushing with silicone lubricant. Engage shift lever yoke with clutch and slide complete assembly into drive gear housing.

REASSEMBLY

1) On diesel model starters, assemble armature and clutch as follows: Lubricate drive end of armature shaft with silicone

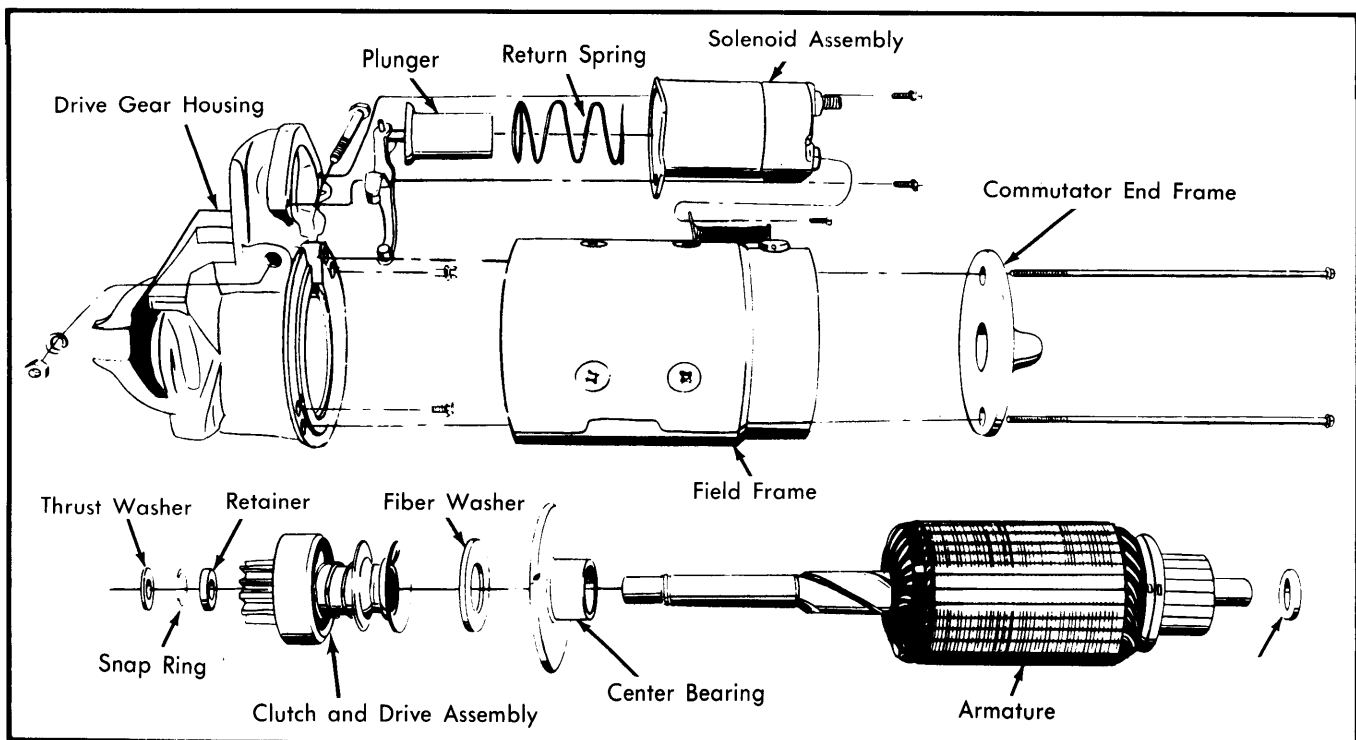


Fig. 5 Exploded View of Delco-Remy 20MT Starter Assembly (5 and 10MT Starters Similar Except without Center Bearing)

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4) Install center bearing screws (diesel only) and shift lever pivot bolt. Tighten securely. Install solenoid assembly on drive gear housing. Apply sealer (No. 1050026) to solenoid flange where it meets the drive housing and field frame, using care not to damage brushes.

5) Position field frame against drive gear housing on alignment pin using care not to damage brushes. Lubricate commutator end frame bushing with silicone lubricant. Install washer on armature shaft and slide end frame onto shaft and install through bolts. On diesel models, install insulator and then end frame onto shaft. Then install through bolts, making sure they pass through bolt holes in insulator.

6) Connect the field coil connector to the solenoid terminal. Check pinion clearance as outlined under Parts Replacement and Testing in this article.

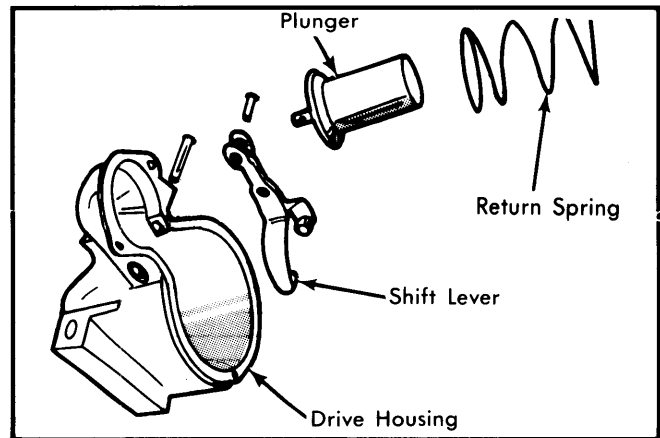


Fig. 6 Exploded View of Shift Lever Assembly