MOTORCRAFT SOLENOID ACTUATED

Ford Motor Co.
W/460" Engine Only

DESCRIPTION

Starter is a four-brush, four-field, four-pole wound unit consisting of a frame and field coil assembly, armature, brush plate assembly, drive and shift lever assemblies and a drive housing and starter solenoid assembly. The frame encloses a wound armature which is supported at the drive end with caged needle bearings and at the commutator end with a sintered copper bearing.

TESTING

STARTER CRANKING CIRCUIT

Connect a battery and a voltmeter to starter *(see Fig. 1)*. Crank engine with ignition off by disconnecting and grounding high tension lead from coil, and connecting jumper from battery terminal of starter relay to "S" terminal of relay. Maximum allowable voltage drop should be as follows:

1) With voltmeter negative lead connected to starter terminal and positive lead connected to battery positive terminal, (connection no. 1 in illustration) voltage drop should not exceed .5 volt.

2) With voltmeter negative lead connected to starter terminal and positive lead connected to battery terminal of starter solenoid, (connection no. 2 in illustration), voltage drop should not exceed .3 volt.

3) With voltmeter negative lead connected to battery terminal of starter solenoid and positive lead connected to positive terminal of battery, (connection no. 3 in illustration), voltage drop should not exceed .2 volt.

4) With voltmeter negative lead connected to negative terminal of battery and positive lead connected to engine ground (connection no. 4 in illustration) voltage drop should not exceed .1 volt.

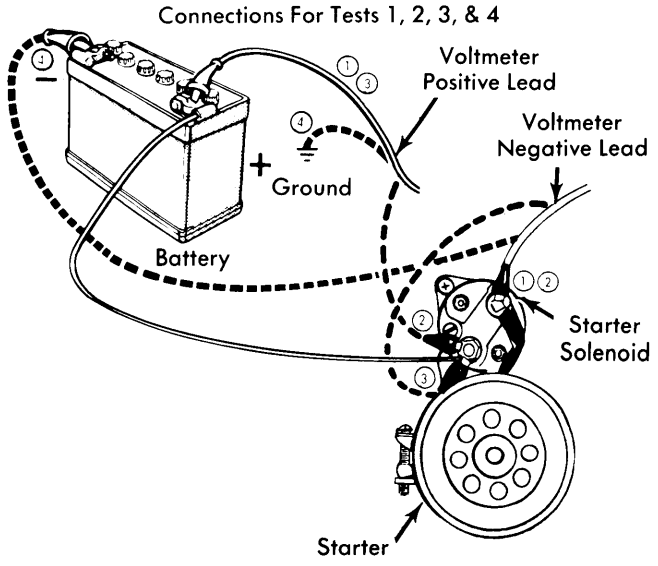

Fig. 1 Connections for Cranking Circuit Test

STARTER LOAD TEST

Connect amp-volt tester, battery and remote starter switch to starter *(see Fig. 2)*. *CAUTION — Make sure no current is flowing through ammeter and position rheostat at maximum counterclockwise position.* Crank engine with ignition off by disconnecting and grounding high tension lead from coil, and connecting jumper from battery terminal of starter relay to "S" terminal of relay. Note voltmeter reading. Stop cranking engine, reduce resistance of carbon pile until voltmeter indicates same reading as when cranking. Ammeter now indicates current draw under load.

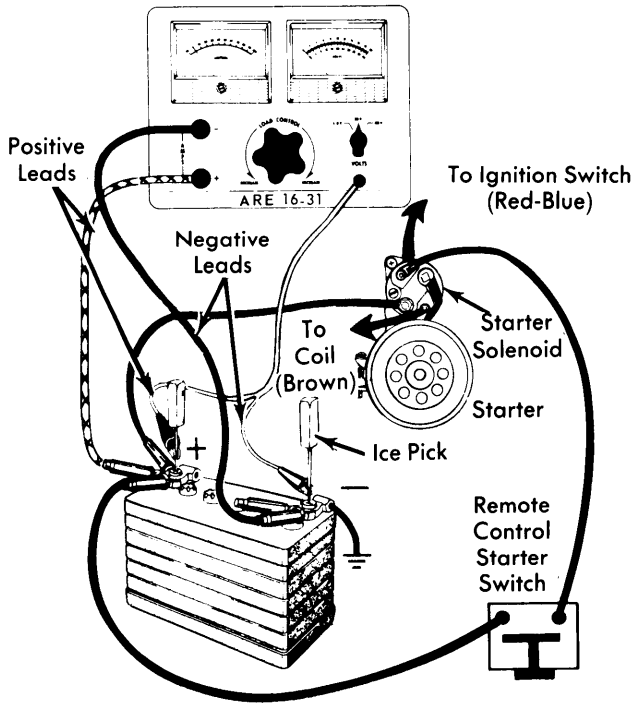

Fig. 2 Connections for Starter Load Test

STARTER NO-LOAD TEST

Connect amp-volt test and battery to starter *(see Fig. 3)*. *CAUTION — Make sure no current is flowing through ammeter and position rheostat at maximum counterclockwise position.* Note voltmeter reading. Disconnect starter from

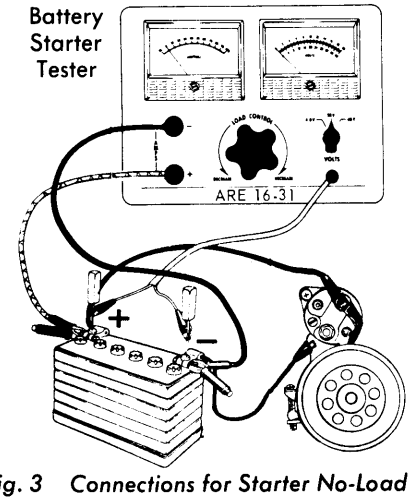

Fig. 3 Connections for Starter No-Load Test

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battery and reduce resistance of rheostat until voltmeter indicates same reading as when starter was running. Ammeter will indicate no-load current draw.

SPECIFICATIONS

Cranking Amperage Draw – 180-210 amperes with a normal cranking speed of 140-170 RPM.

Brush Spring Tension – 40 ozs.

No-Load Current Draw – 70 amps.

OVERHAUL

DISASSEMBLY

CAUTION – Solenoid actuated starters used with starter relays require use of a special solenoid connector link as shown in Fig. 4. When servicing starters, reinstall link, if used. If link is not reinstalled on starters with starter relays, starter will not crank. If link is installed on starters without starter relays, starter will begin to crank as soon as the battery is connected.

1) Disconnect copper strap from starter terminal on solenoid. Remove attaching screws and remove solenoid from drive housing. Loosen retaining screw and slide brush cover band back on starter frame for access to brushes. Hold each brush spring away from the brush with a hook, and slide brush out of holder.

2) Remove through bolts and separate drive end housing, starter frame, and end plate assemblies. Remove solenoid plunger and shift fork assembly. *NOTE – If either plunger or fork is to be replaced, separate by removing roll pin.* Remove armature and drive assembly from frame. Remove drive stop ring, then slide drive assembly off armature shaft. Remove drive stop ring retainer from housing.

CLEANING

Use a brush or compressed air to clean drive, field coils, armature, commutator, armature shaft front end plate, and rear end housing. Wash all other components in cleaning solvent and dry.

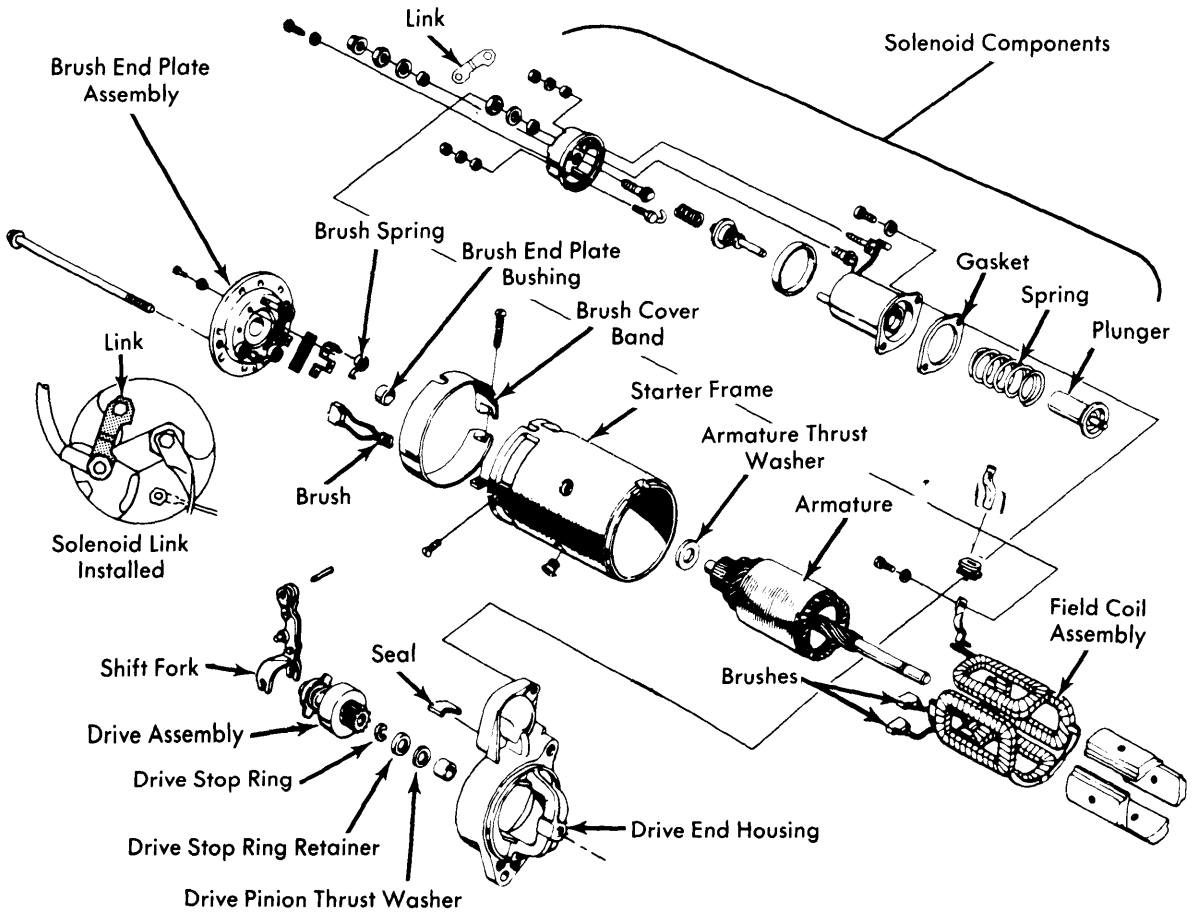

Fig. 4 Exploded View of Solenoid Actuated Starter

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PARTS REPLACEMENT & TESTING

Brushes & Springs – Check brush holders for broken springs and insulated brush holders for shorts to ground. Tighten any loose rivets. Replace brushes if worn to ¼" in length. Measure spring tension with spring scale hooked under spring near end, pull on line parallel to edge of brush and note the reading just as spring end leaves brush. Spring tension should be 40 ozs. If replacing brushes, use a 300 watt soldering iron and rosin core solder.

Armature – Check armature for shorted coils with a growler. Test for grounded coils using a test light, or a voltmeter and battery connected in series by touching one test probe to commutator and other test probe to core or armature shaft. If test light glows, or voltmeter shows any reading, coils are grounded. Inspect armature shaft and two bearings for scoring or excessive wear. Inspect armature windings for broken or burned insulation and unsoldered connections. If commutator is rough or more than .005" out of round, reface in a lathe removing only enough material to provide a smooth, even surface.

Field Coil Assembly – Inspect the field coils for burned or broken insulation and continuity. Check field brush connections and lead insulation. Check for grounded field windings using a voltmeter. If voltmeter indicates any voltage, field windings are grounded.

REASSEMBLY

1) Install small amount of Lubriplate on armature shaft splines, then install drive assembly on shaft and install a new stop ring. Lubricate shift lever pivot pin. Position solenoid plunger and shift lever assembly in drive housing. Install new retainer in drive housing.

2) Lubricate drive end of armature shaft. Install armature and drive assembly into drive housing while making sure shift lever tangs properly engage drive assembly. Lubricate commutator end of armature shaft. Position frame and field assembly in drive housing while making sure frame is properly indexed to drive housing.

3) Install brush plate on frame assembly making sure indexing is correct. Install through bolts and tighten to 45-85 inch lbs. Install brushes in holders while pulling spring back using a hook to allow brush installation. Center spring on brush. Press insulated brush leads away from all other interior components to prevent shorts.

4) Position rubber gasket between solenoid mounting and upper outside surface of frame. Position solenoid with metal gasket (if used) and install attaching screws. Connect copper strap to starter terminal on solenoid. Position cover band and tighten screw.