1966-74 CHRYSLER CORP. GEAR REDUCTION

DESCRIPTION

Starter has a 3.5 to 1 reduction gear set built into starter assembly, which is housed in an aluminum die casting. Starter utilizes a solenoid shift device. Housing of solenoid is integral with starter drive end housing.

TESTING

AMPERAGE DRAW TEST

Connect an ammeter and carbon pile rheostat across battery with all resistance turned into circuit, connect a voltmeter across battery. Disconnect coil primary lead to prevent engine starting. Crank engine and note exact voltmeter reading with starter operating. Without cranking eingine, adjust carbon pile rheostat to load battery until exact same voltmeter reading is obtained. Ammeter now indicates starter amperage draw (see specifications). *NOTE – Engine must be at operating temperature when making test. Cold or tight engine, or heavy oil will increase current draw.*

INSULATED CIRCUIT TEST

Turn voltmeter switch to 4 volt position. Disconnect ignition coil secondary cable. Connect voltmeter positive lead to battery positive post and negative lead to solenoid connector which connects to starter field coils. *NOTE – Voltmeter will read off scale until starter actuated.* Crank engine with remote starter and note voltmeter reading. Reading should not exceed .3 volt. If reading higher, it indicates high resistance in starter insulated circuit. Remove voltmeter lead from solenoid connector and connect to following points, repeating test at each connection: Starter terminal of solenoid, battery cable terminal at solenoid, starter relay and cable clamp at battery. A small change will occur each time a normal portion of circuit is removed from test. A definite change in voltmeter reading indicates last part eliminated in test is at fault. Maximum allowable voltage loss is as follows: Battery insulated cable (.2 volt), Solenoid switch (.1 volt), each connection (.0 volt).

RESISTANCE TEST

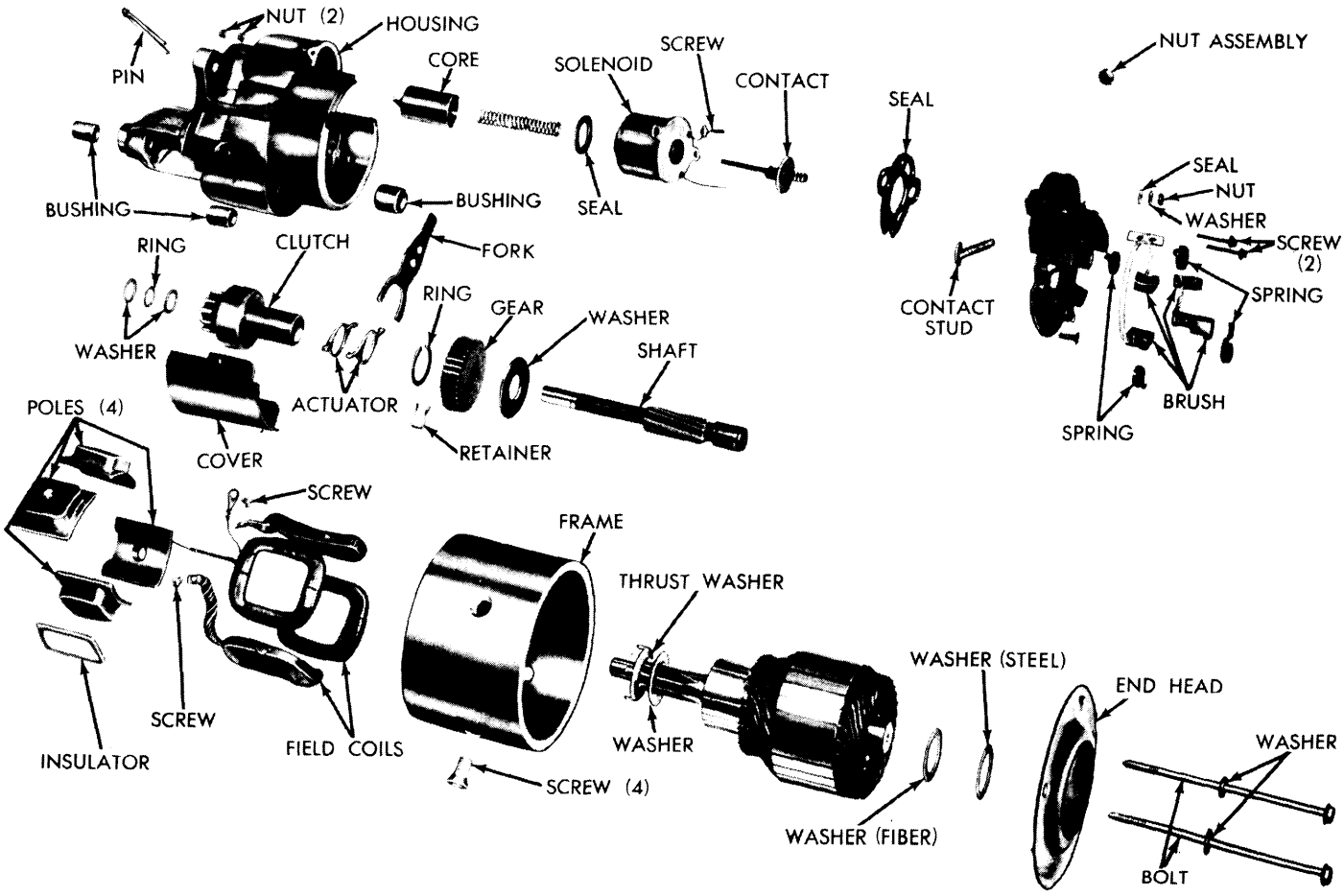
Disconnect battery positive cable, connect a 0-300 scale ammeter between disconnected lead and battery. Connect a voltmeter with 10 volt scale between battery positive post and starter switch terminal at solenoid. Crank engine and observe voltmeter and ammeter readings. Voltage should not exceed .3 volt. A higher reading indicates high resistance caused by loose circuit connections, faulty cable, burned starter relay or burned solenoid switch contacts. A high current combined with slow cranking speed, indicates starter should be removed and repaired.

GROUND CIRCUIT TEST

Connect voltmeter across battery. Crank engine and observe voltmeter reading. Reading should not exceed .2 volt. If reading higher, it indicates excessive voltage loss in starter ground circuit.

NO LOAD TEST (ON BENCH)

Connect a test ammeter and carbon pile rheostat in series with battery positive post and starter terminal. Connect a



CHRYSLER CORP. REDUCTION GEAR STARTER ASSEMBLY

1966-74 CHRYSLER CORP. GEAR REDUCTION (Cont.)

voltmeter across starter. Rotate carbon pile to full resistance position. Connect battery cable from battery negative post to starter frame. Adjust rheostat until battery voltage shown on voltmeter reads 11 volts. Amperage draw should be as shown in specifications.

LOCKED RESISTANCE TEST

Mount starter in test bench. Follow test equipment manufacturers instructions. With battery voltage adjusted to 4 volts, amperage draw should be as shown in specifications.

SPECIFICATIONS

Cranking Amperage Draw – 155-170 amps. (198" Engine), 165-180 amps. (225", 318" & 340" Engines), 180-200 amps. (360", 383", 400", 426" & 440" Engines), with engine at normal operating temperature.

Brush Spring Tension – 32-36 ozs.
Rotation – Clockwise at pinion end.
Armature Shaft End Play – .010"-.045".

CHRYSLER CORP. STARTER SPECIFICATIONS

Chrysler Number	No Load Test (At 11.0 Volts)		Lock Test	
	RPM	Amps. Max.	Amps.	Volts
2095150	1925-2400	90	400-450	4.0
2098500	2590	90	340-420	4.0
2875560	1925-2600	90	400-450	4.0
3656575	3500-4300	90	475-550	4.0
3656650	3500-4300	90	475-550	4.0

OVERHAUL

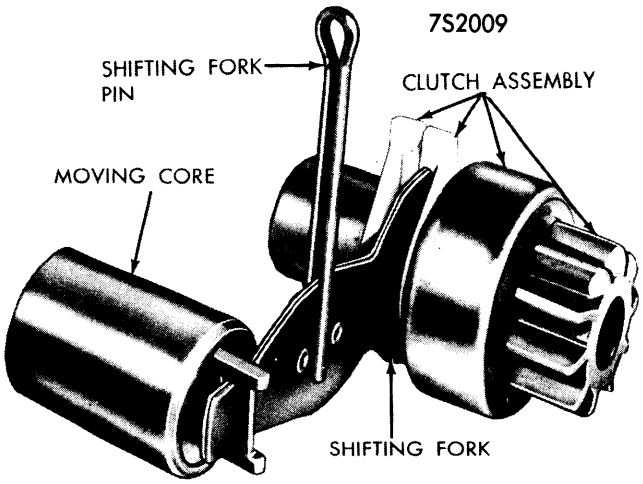
DISASSEMBLY

1) Remove through bolts and end plate. Carefully pull armature up and out. Remove steel and fiber thrust washer. *NOTE – Shunt field coil wire is wrapped on brush terminal. One set of brushes is connected to this terminal, other set of brushes is attached to series field coils by a terminal screw. Carefully pull frame and field assembly up just enough to expose screw and solder connection at brush terminal. Place two wood blocks between frame and gear housing to aid removal of screw.*

2) Remove terminal screw and unwrap shunt field coil lead from brush terminal. *NOTE – Brush holder plate with brush terminal, contact and brushes is serviced as an assembly.* Unwrap solenoid lead wire and unwind wire from brush terminal. Remove nut, steel washer and insulating washer from solenoid terminal. Straighten solenoid wire and and remove brush holder plate with brushes and solenoid as an assembly. Remove solenoid assembly from gear housing well.

3) Remove following (in sequence); nut from starter battery terminal, starter battery terminal from holder plate, solenoid contact and plunger from solenoid, solenoid return spring from well of solenoid housing moving core, dust cover from gear housing. Release retainer clip that positions driven gear on pinion shaft. *CAUTION – Retainer is under tension.* Release retainer ring at front of pinion shaft. *NOTE – Do not spread ring greater than outside diameter of shaft or ring will be damaged.*

4) Push pinion shaft towards rear of housing, remove retainer ring and thrust washers, clutch and pinion assembly (with 2 shift fork nylon actuators as an assembly). Remove driven gear and friction washer. Pull shifting fork forward and remove solenoid moving core. Remove shifting fork retainer pin and remove clutch shifting fork assembly.



SHIFT FORK & CLUTCH ASSEMBLY

CLEANING

Do not immerse parts in cleaning solvent. Clutch outer housing and pinion gear may be cleaned with a cloth moistened with cleaning solvent then wiped dry. Clean all corrosion from solenoid assembly and inside of solenoid housing (these are part of solenoid hold-in ground circuit and must be clean). Clean terminal contacts and contactor with crocus cloth.

PARTS REPLACEMENT & TESTING

Brushes & Springs – Replace if oil soaked or worn more than ½-length of new brushes. When resoldering shunt field and solenoid lead, use high temperature solder and resin flux. *NOTE – Do not use acid core solder.* Measure spring tension with spring scale hooked under spring near end, pull on line parallel to edge of brush and note reading just as spring end leaves brush. Replace if tension not within specifications.

Armature – Check for shorted armature coils in a growler. Check for grounded coils by touching one test light probe to armature shaft and other probe to each commutator bar. Lamp should not light. If lamp lights, armature coils are grounded and armature should be replaced. Commutator should be smooth and clean, runout must not exceed .003" If runout excessive, reface in a lathe removing only sufficient material to provide smooth even surface.

Field Coil Assembly – With field frame removed from starter, drill out rivet attaching field coil lead and shunt coil lead to frame, then insulate leads from frame. Test for ground with 110 volt test lamp by touching one probe to series coil lead and other probe to field frame. Lamp should not light. If lamp lights, coils are grounded and should be replaced. Test shunt coil similarly. To replace coils, use impact screwdriver (C-3475) to insure correct tightening of pole pieces without damage to mounting screws. Make certain ground lead terminal and field frame are clean, peen rivet securely to ensure good ground.

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Starter Shaft Bushings – Inspect shaft bearing surfaces for wear, check bushing wear by inserting shaft and checking sideplay. Replace end head if bushing worn (furnished as an assembly). Replace other bushings with Tool C-3944 and adapters. Service bushings are pre-sized and do not require burnishing or reaming.

Starter Clutch Unit – *CAUTION – Do not immerse in cleaning solvent (pre-lubricated and lubricant will be washed out).* Pinion should rotate smoothly in one direction (not necessarily easily) and should not rotate in opposite direction. If not functioning properly, or if pinion worn, chipped or burred, replace assembly.

REASSEMBLY

1) Make sure shift fork plates have approximately 1/16" side movement, lubricate sparingly between plates with SAE 10 engine oil. Position shift fork in housing bending one tip of pin at 15° angle away from housing. *NOTE – Fork and pin must operate freely.* Install solenoid moving core and engage shifting fork.

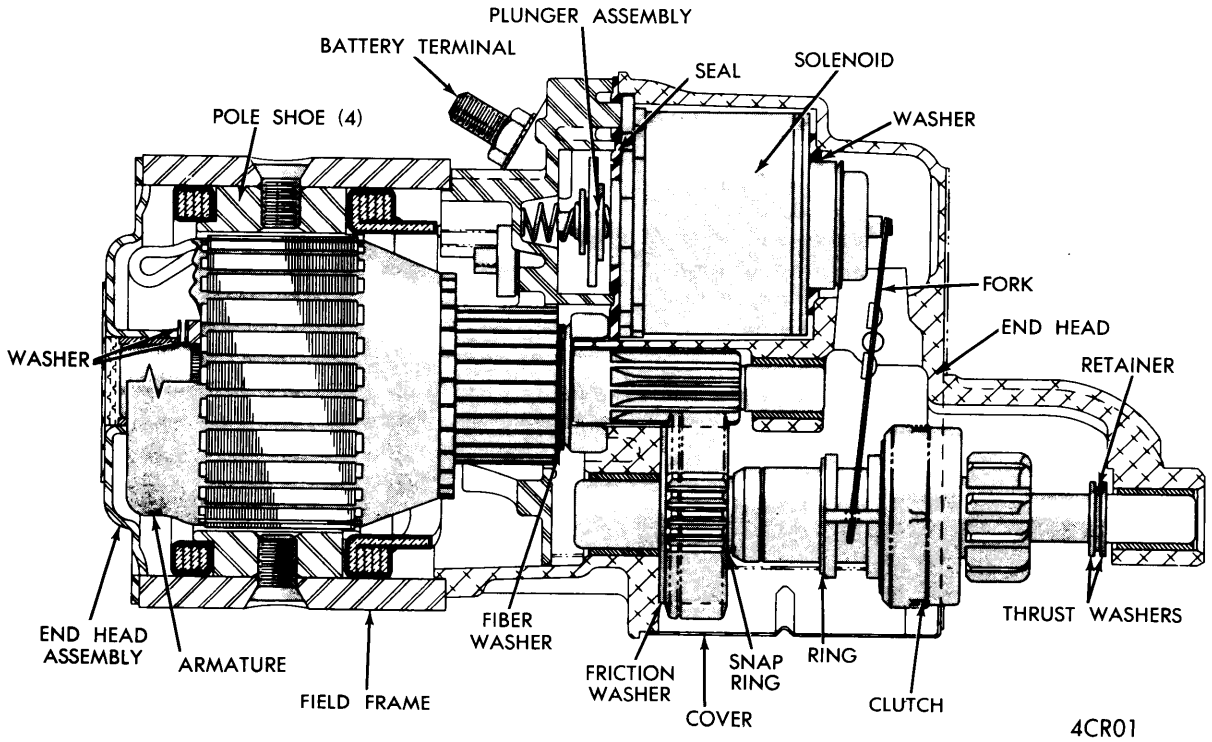
2) Start pinion shaft into drive housing, install friction washer and drive gear, clutch and pinion assembly, thrust washer, retaining ring and thrust washer. Make sure shift fork engages clutch actuators properly. *NOTE – Friction washer must be positioned on shoulder of splines of pinion shaft before driven gear is positioned.* Install driven gear snap ring, pinion shaft retaining ring, starter solenoid return spring into bore of movable core.

3) Install solenoid contact plunger assembly into solenoid and reform double wires to allow for proper entry of terminal stud into brush holder with double wires curved around contactor. *CAUTION – Contactor must not touch wires when solenoid is energized after assembly.* Assemble battery terminal stud in brush holder. Position seal on brush holder plate.

4) Start solenoid lead wire through hole in brush holder, install solenoid stud, insulating washer, flat washer and nut. Wrap lead wire tightly around brush terminal post, solder with high temperature resin core solder and resin flux. Install brush holder to solenoid attaching screws. Enter solenoid coil and brush plate assembly into starter gear housing, install and tighten attaching nuts.

5) Install armature thrust washer in brushes with brushes resting on washer tabs (washer will hold brushes out and facilitate armature installation). Solder shunt coil lead wire to starter brush terminal. Install brush terminal screw.

6) Place field frame in exact correct position on gear housing, enter armature into field frame and gear housing being careful to pickup thrust washer installed in starter brushes, engage shaft teeth with reduction gear by rotating armature as necessary. Install fiber thrust washer and steel washer on end of armature shaft, position end head assembly on field frame and install through bolts and lockwashers, tighten bolts securely.



CROSS SECTION, CHRYSLER GEAR REDUCTION STARTER