

2004-05 STARTING & CHARGING SYSTEMS**Starters - Sedona****DESCRIPTION & OPERATION****STARTER CIRCUIT**

The starting system includes the battery, starter motor, solenoid switch, ignition switch, inhibitor switch (A/T only), connection wires and the battery cables. When the ignition is turned to START position, current flows and energizes the starter motor's solenoid coil. The solenoid plunger and clutch shift lever are activated, and the clutch pinion engages the ring gear. The contacts close and the starter motor cranks. In order to prevent damage caused by excessive rotation of the starter armature when the engine starts, the clutch pinion gear overruns.

ADJUSTMENTS**PINION GAP**

CAUTION: To prevent coil from burning, DO NOT apply voltage to starter assembly for more than 10 seconds.

1. With starter on a bench, disconnect the field coil wire from the "M" terminal of the solenoid. See **Fig. 1** .
2. Connect a 12V battery between "S" terminal and "M" terminal.
3. The pinion will move out.
4. Check the gap between pinion and stopper with a feeler gauge. See **STARTER SPECIFICATIONS** . See **Fig. 2** .
5. If the pinion gap is out of specification, make adjustment by increasing or decreasing number of gaskets between the solenoid and the front bracket.

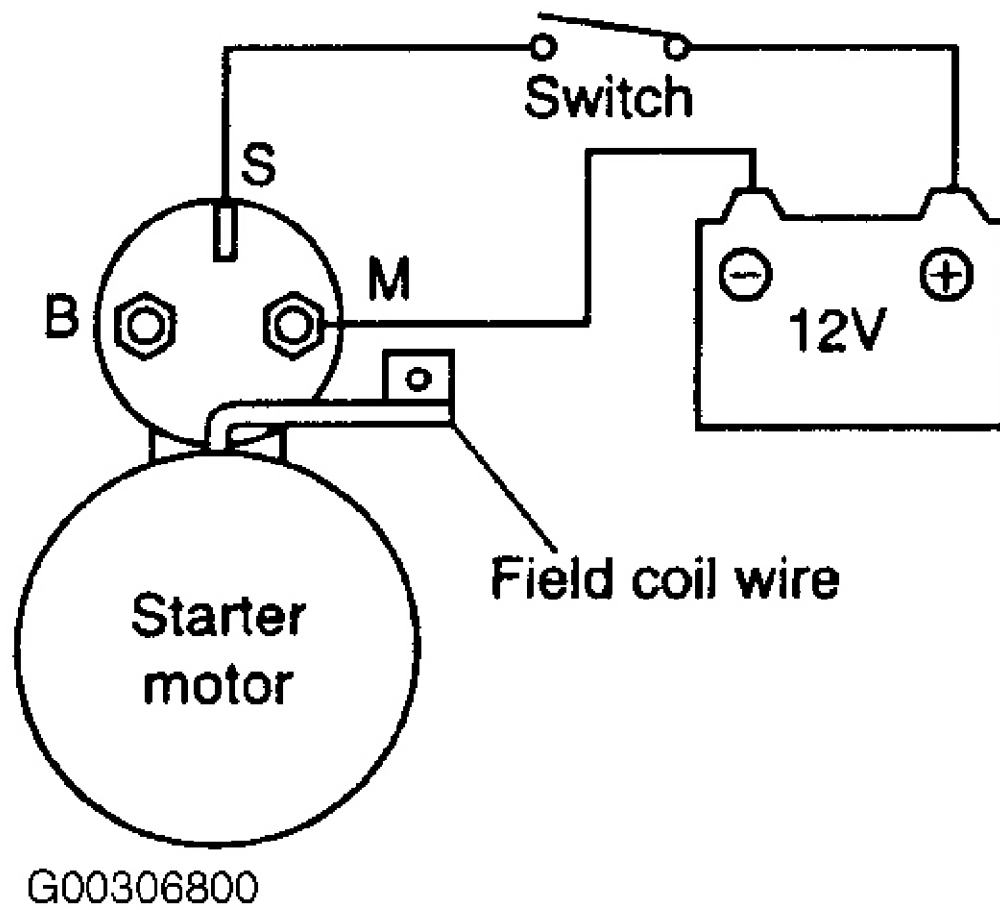


Fig. 1: Checking Pinion Gap

Courtesy of KIA MOTORS AMERICA, INC.

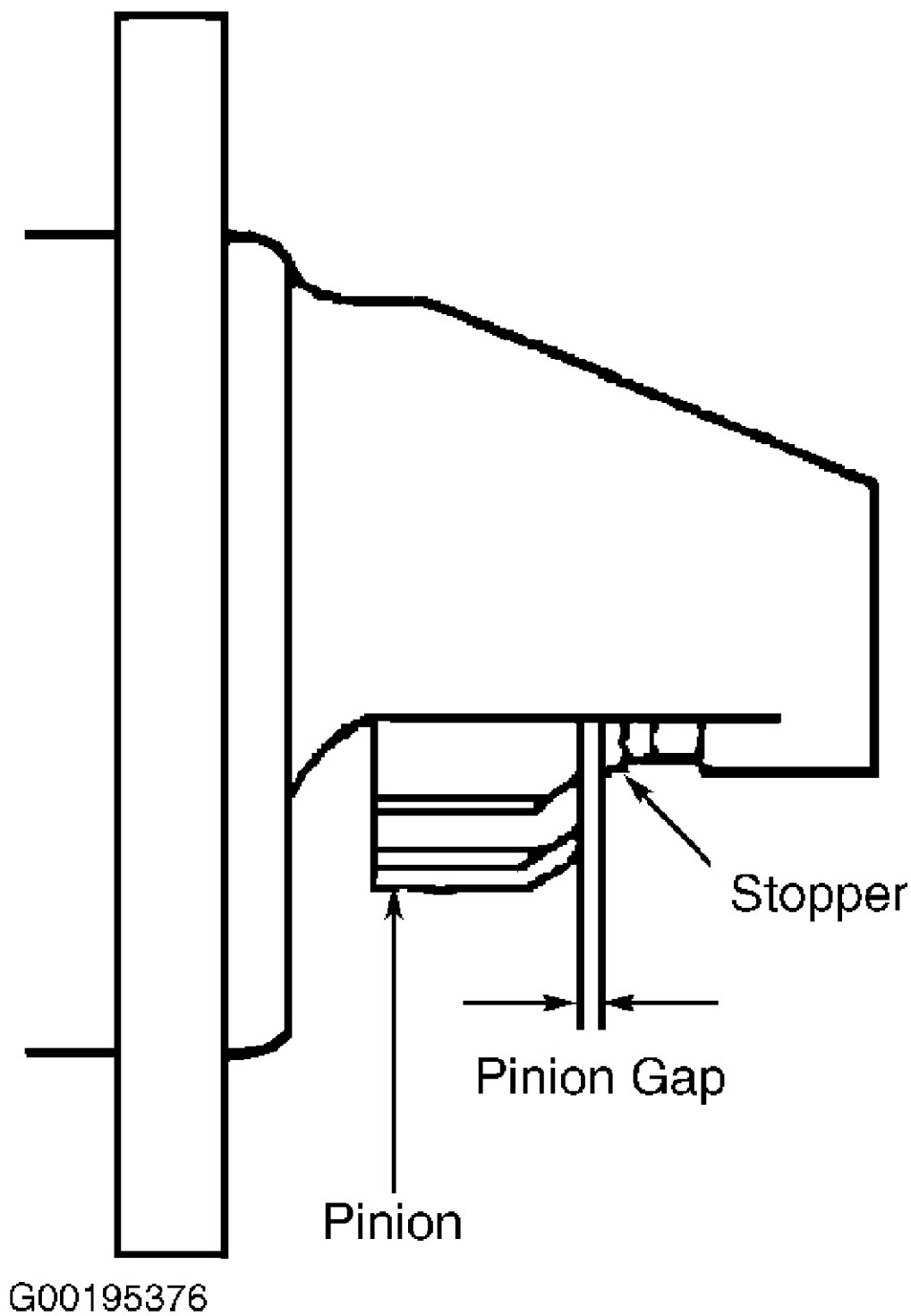


Fig. 2: Adjusting Pinion Gap
Courtesy of KIA MOTORS AMERICA, INC.

TROUBLE SHOOTING

NOTE: See STARTER - GENERAL TROUBLE SHOOTING article in GENERAL INFORMATION.

BENCH TESTING

MAGNETIC SWITCH PULL-IN TEST

CAUTION: To prevent coil from burning, DO NOT apply voltage to starter assembly for

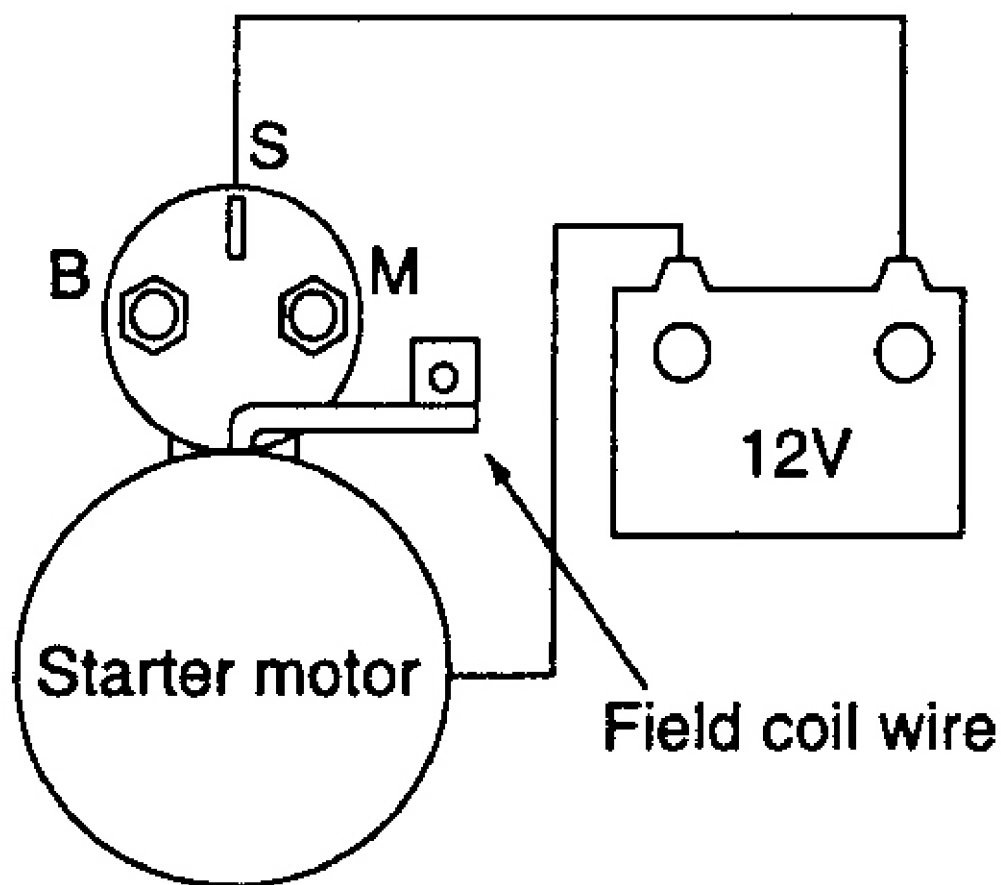
more than 10 seconds.

1. Disconnect the field coil wire from the "M" terminal of the magnetic switch.
2. Connect a 12V battery between "S" terminal and the "M" terminal. See **Fig. 1**
3. If the pinion moves out, then the pull-in coil is good. If it doesn't move out, replace the magnetic switch.

MAGNETIC SWITCH HOLD-IN TEST

CAUTION: To prevent coil from burning, DO NOT apply voltage to starter assembly for more than 10 seconds.

1. Disconnect the field coil wire from the "M" terminal of the magnetic switch.
2. Connect a 12V battery between "S" terminal and the body. See **Fig. 3**.
3. If the pinion moves out, everything is in order. If the pinion moves back and forth repeatedly, the hold-in circuit is open. Then replace the magnetic switch.



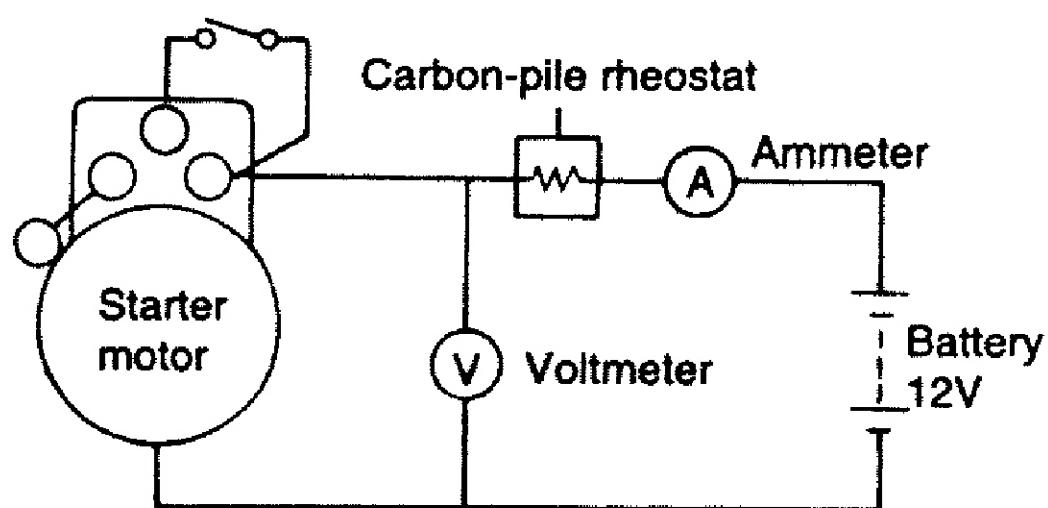
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Fig. 3: Performing Magnetic Switch Hold-In Test
Courtesy of KIA MOTORS AMERICA, INC.

FREE RUNNING TEST

1. Place the starter motor in a vise equipped with soft jaws and connect a fully-charged 12 volt battery to starter motor.

2. Connect a test ammeter (100-ampere scale) and carbon pile rheostat. See **Fig. 4**.
3. Connect a voltmeter (15-volt scale) across starter motor.
4. Rotate carbon pile to the off position.
5. Connect the battery cable from battery's negative post to the starter motor body.
6. Adjust until battery voltage shown on the voltmeter reads 11 volts.
7. Confirm that amperage is 90 amps or less at 2800 RPM or less, and that starter motor turns smoothly and freely.



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Fig. 4: Performing Free Running Test
 Courtesy of KIA MOTORS AMERICA, INC.

MAGNETIC SWITCH RETURN TEST

CAUTION: To prevent coil from burning, DO NOT apply voltage to starter assembly for more than 10 seconds.

1. Disconnect field coil wire from the "M" terminal of the magnetic switch.
2. Connect a 12-volt battery between "M" terminal and the body. See **Fig. 3**.
3. Pull pinion out and release. If pinion returns quickly to its original position, everything is in order. If it doesn't, replace the magnetic switch.

CHECKING THE COMMUTATOR

1. Place the armature on a pair of V- blocks and check the run out by using a dial gauge. See **STARTER SPECIFICATIONS**.
2. Check the outer diameter of the commutator. See **STARTER SPECIFICATIONS**.
3. Check the depth of the undercut between segments. See **STARTER SPECIFICATIONS**.

BRUSH HOLDER

1. Check for continuity between the brush holder plate and brush holder. See **Fig. 5**.
2. The normal condition is no continuity.

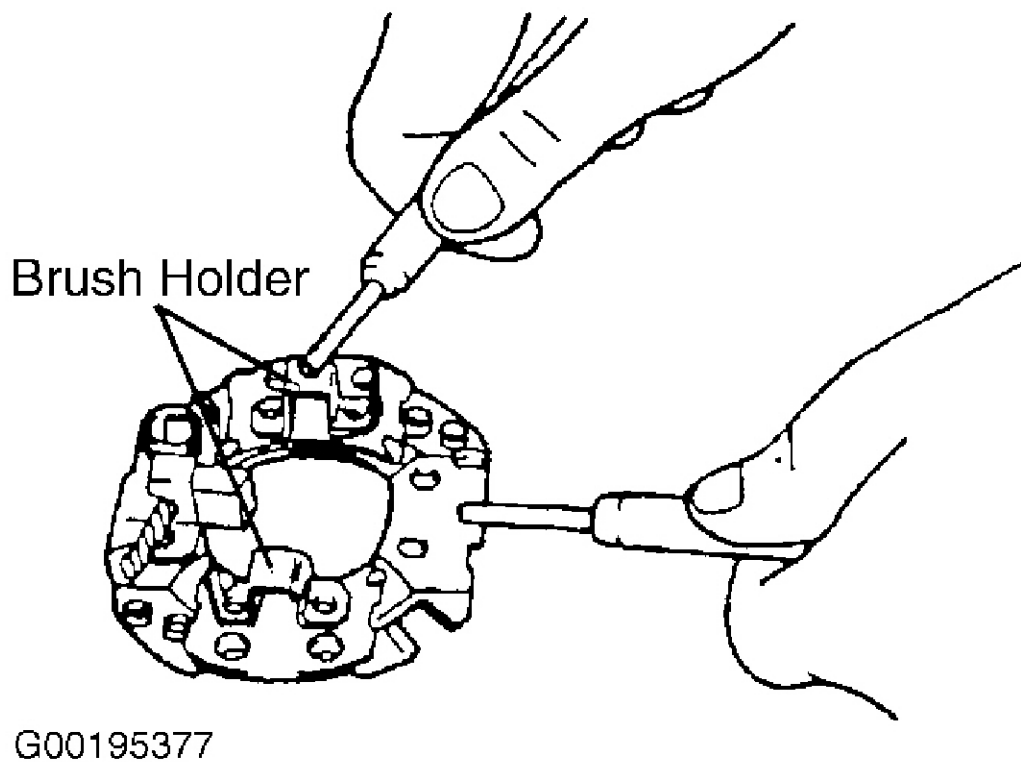
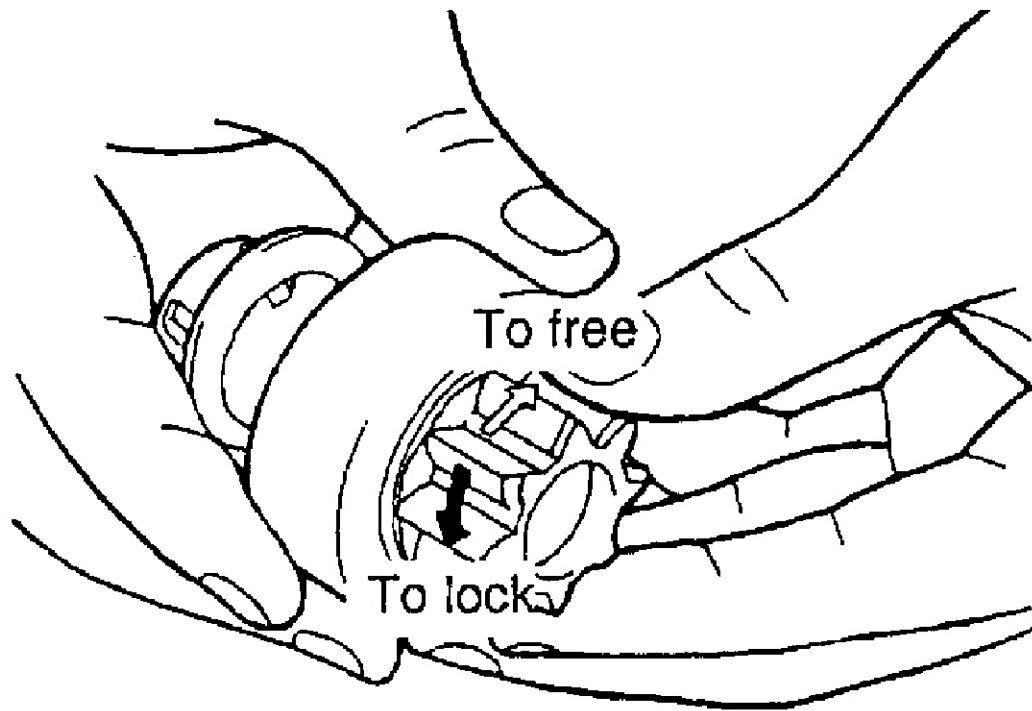


Fig. 5: Checking Brush Holder & Plate Continuity
Courtesy of KIA MOTORS AMERICA, INC.

OVERRUNNING CLUTCH

1. While holding clutch housing, rotate the pinion. Drive pinion should rotate smoothly in one direction, but should not rotate in opposite direction. See **Fig. 6** . If clutch does not function properly, replace overrunning clutch assembly.
2. Inspect pinion for wear or burrs. If pinion is worn or burred, replace overrunning clutch assembly. If pinion is damaged, also inspect ring gear for wear or burrs.



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Fig. 6: Checking Overrunning Clutch
Courtesy of KIA MOTORS AMERICA, INC.

REMOVAL & INSTALLATION

STARTER

Removal & Installation

NOTE: Information is not available from manufacturer.

OVERHAUL

NOTE: To assist in overhaul use illustration. See Fig. 7 .

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Fig. 7: Exploded View of Starter
Courtesy of KIA MOTORS AMERICA, INC.

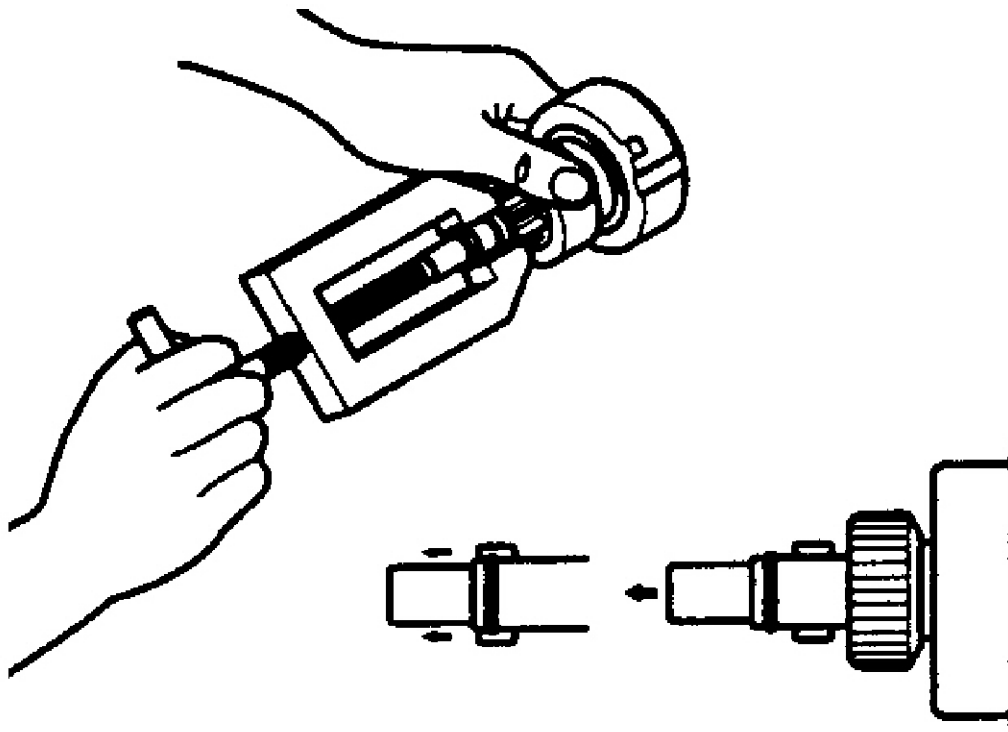
STARTER

Disassembly (Stop Ring & Snap Ring)

1. Press the stop ring to the snap ring side using a socket wrench to the snap ring side.
2. After removing the snap ring (using snap-ring pliers), remove the stop ring and the overrunning clutch.

Reassembly (Stop Ring & Snap Ring)

NOTE: Using a suitable pulling tool, pull overrunning clutch stop ring over snap ring. See **Fig. 8** .



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Fig. 8: Pulling Overrunning Clutch Stop Ring Over Snap Ring
 Courtesy of KIA MOTORS AMERICA, INC.

Cleaning

CAUTION: Do not immerse drive unit and parts in cleaning solvent. Immersing the yoke and field coil assembly and/or armature will damage insulation. Wipe these parts with a cloth only.

Overrunning clutch is pre-lubricated at the factory and solvent will wash lubrication from clutch. The drive unit may be cleaned with a brush moistened with cleaning solvent and wiped dry with a cloth.

Brush & Spring Replacement

1. Brushes that are worn out, or oil-soaked, should be replaced.
2. When replacing field coil brushes, crush worn out brush with pliers, taking care not to damage pigtail.
3. Sand the pigtail end with sandpaper to ensure good soldering.
4. Insert the pigtail into hole provided in the new brush and solder it. Make sure that the pigtail and excess solder do not come out onto the brush surface.
5. When replacing the ground brush, slide the brush from brush holder by prying retaining the spring back.

STARTER SPECIFICATIONS

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Application	Specification
Armature	
Commutator Runout	
Standard	002" (.05 mm)

Limit	.0039" (.1 mm)
Commutator Diameter	
Standard	1.157" (29.4 mm)
Limit	1.118" (28.4mm)
Commutator Undercut (Mica) Depth	
Standard	0.02" (0.5 mm)
Limit	0.79" (.2 mm)
Brush Length	(1)
Pinion Gap	0.79" (.2 mm)

(1) Information is not available from manufacturer.

TORQUE SPECIFICATIONS

Information is not available from manufacturer.

WIRING DIAGRAMS

See STARTING/CHARGING in appropriate SYSTEM WIRING DIAGRAMS article in ELECTRICAL.

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