

Component Procedures: Starter Motor

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Component Procedures: Starter Motor

Parts and Labor (itype_189)

Parts

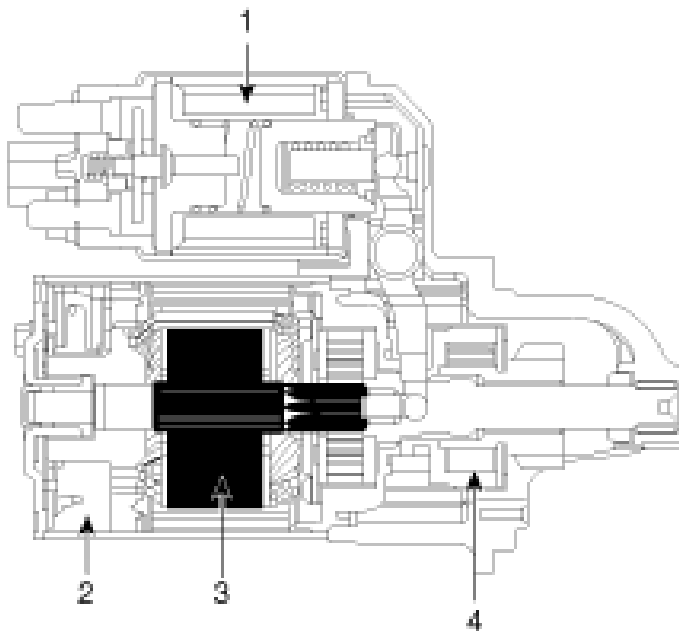
Qualifier	Part #	Name	Price	Note
Starter > Starter	361002E200	Korea Built	416.16	
Starter > Starter	361002E551	Us Built	418.27	

Labor

Operation	Qualifier Path	Skill	Std Hrs	Wty Hrs
Remove & Install	Starter > Starter, R&I	B	0.9	0.0
Remove & Replace	Starter > Starter, R&R	B	0.9	0.0

Starter - Description and Operation (Article 44046)

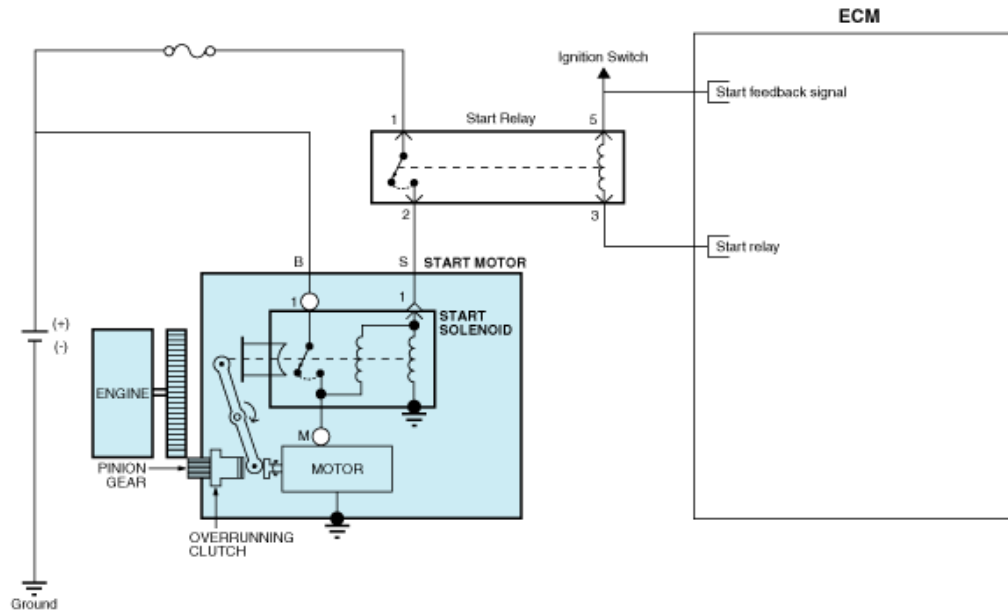
- Description



1. Solenoid 2. Brush 3. Armature 4. Overrun clutch

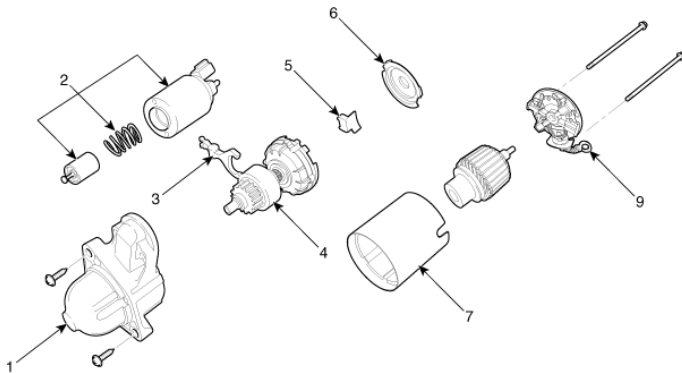
Starter - Schematic Diagrams (Article 44051)

- Circuit Diagram



Starter - Components and Components Location (Article 44049)

- Components

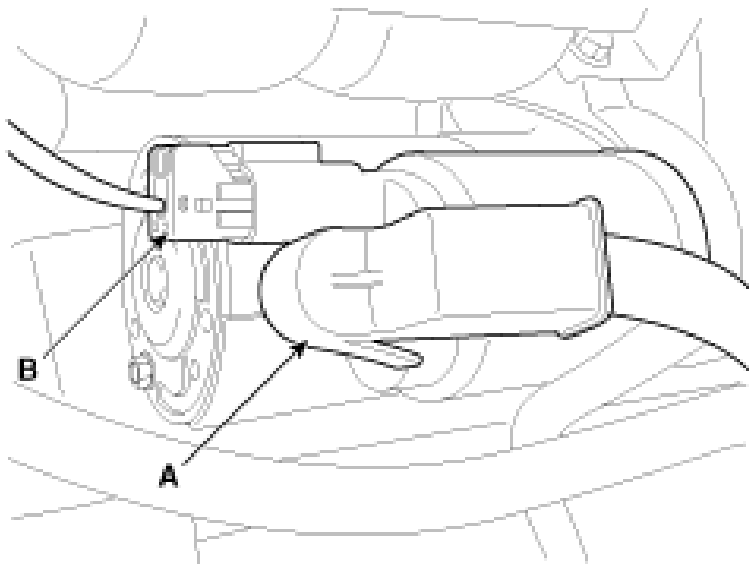


1. Front bracket assembly 2. Magnet switch assembly 3. Lever 4. Reducer assembly 5. Lever stop 6. Gasket sheet
7. Yoke assembly 8. Armature assembly 9. Brush holder assembly

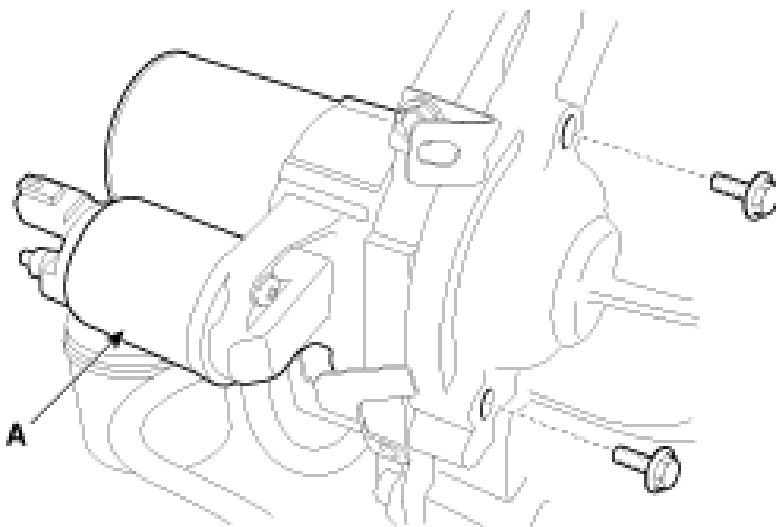
Starter - Repair Procedures (Article 44052)

- Removal

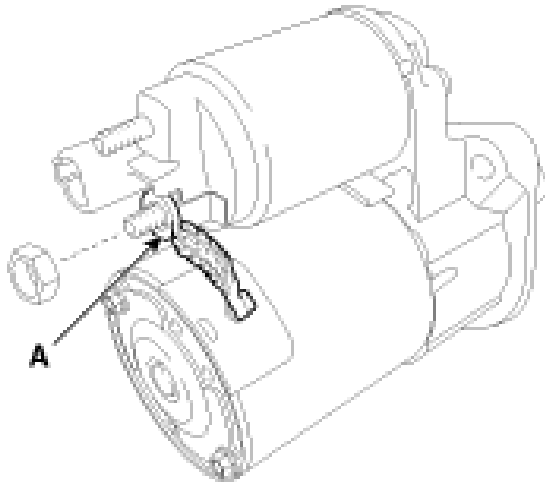
- Disconnect the battery negative terminal.
- Remove the battery tray . (Refer to Engine Electrical System - "Battery")
- Remove the air duct and air cleaner assembly. (Refer to Engine Mechanical System - "Air Cleaner")
- Disconnect the starter cable (A) from the B terminal on the solenoid then disconnect the connector from the S terminal (B).



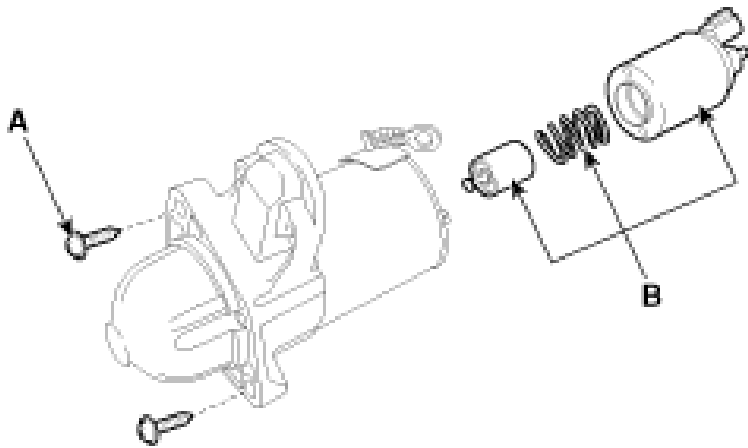
- Remove the 2 bolts holding the starter , then remove the starter (A).



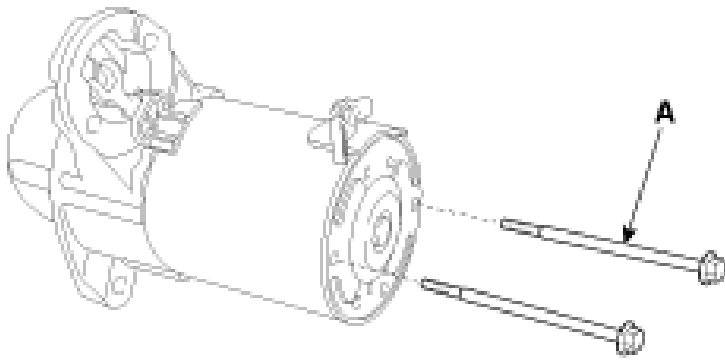
- Installation
- Install in the reverse order of removal. Starter installation bolt : 49.0 - 63.7 N.m (5.0 - 6.5 kgf.m, 36.2 - 47.0 lb-ft)
- Disassembly
- Disconnect the M-terminal (A) on the magnet switch assembly.



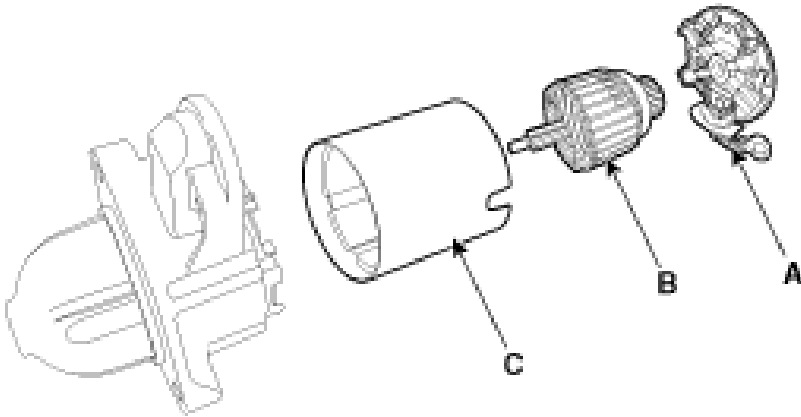
- After loosening the screws (A), detach the magnet switch ssembly (B).



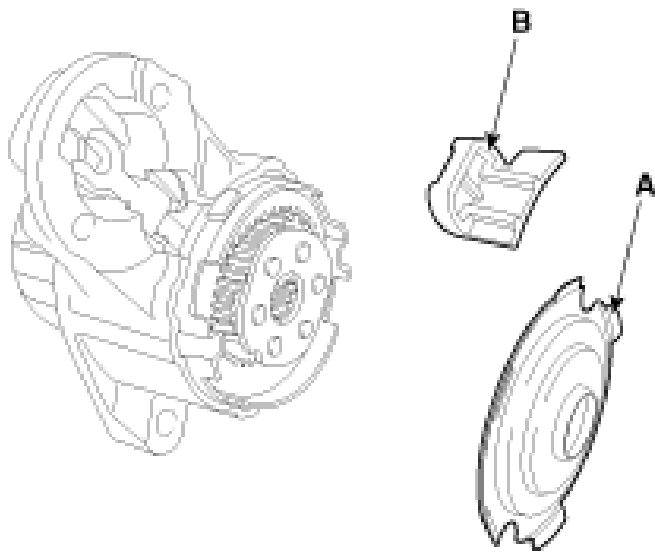
- Loosen the through bolts (A).



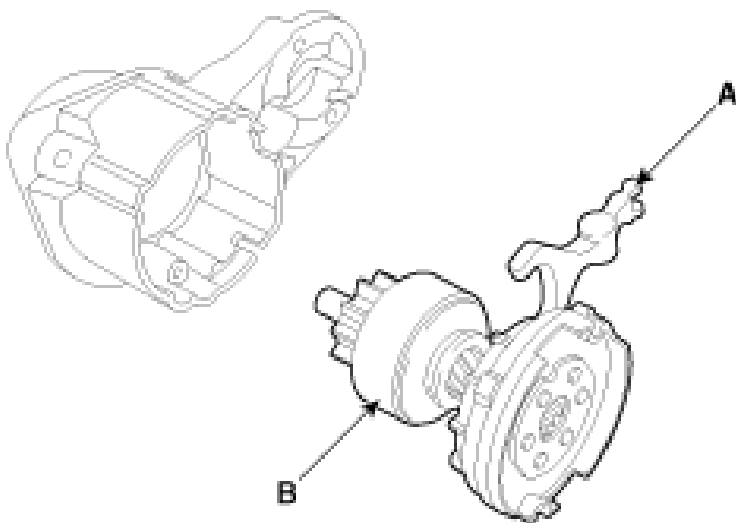
- Remove the brush holder assembly (A), armature assembly (B) and yoke assembly (C).



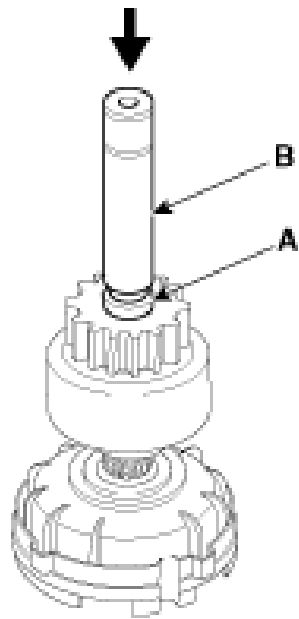
- Remove the gasket sheet (A) and lever stop (B).



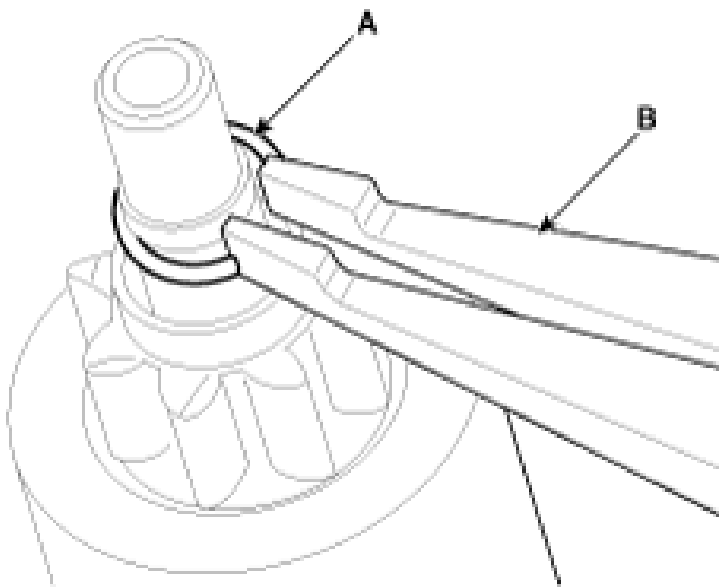
- Remove the reducer assembly (A) and lever (B).



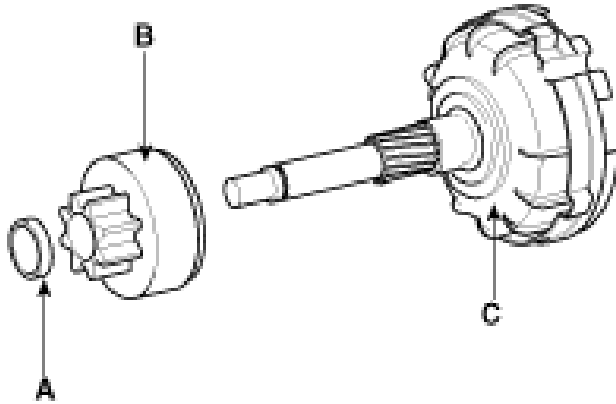
- Press the stopper (A) using a socket (B).



- After removing the stop ring (A) using stop ring pliers (B).



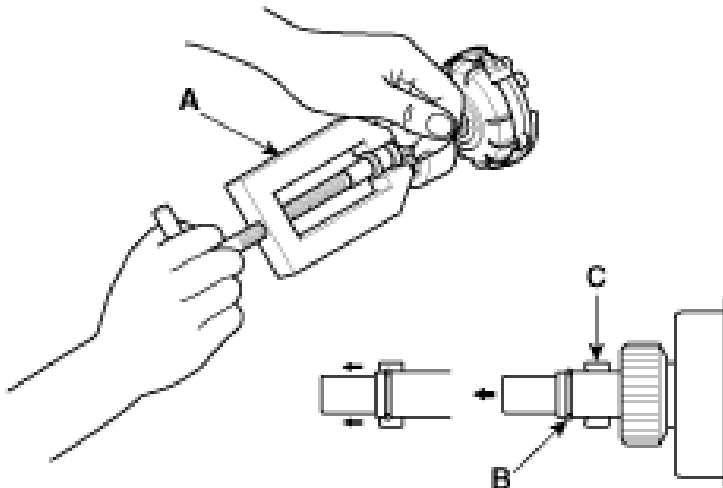
- Disconnect the stopper (A), overrunning clutch (B) and internal gear (C). Using a suitable pulling tool (A), pull the overrunning clutch stopper (C) over the stop ring (B).



Using a suitable pulling tool (A), pull the overrunning clutch stopper (C) over the stop ring (B).

NOTICE

- Using a suitable pulling tool (A), pull the overrunning clutch stopper (C) over the stop ring (B).

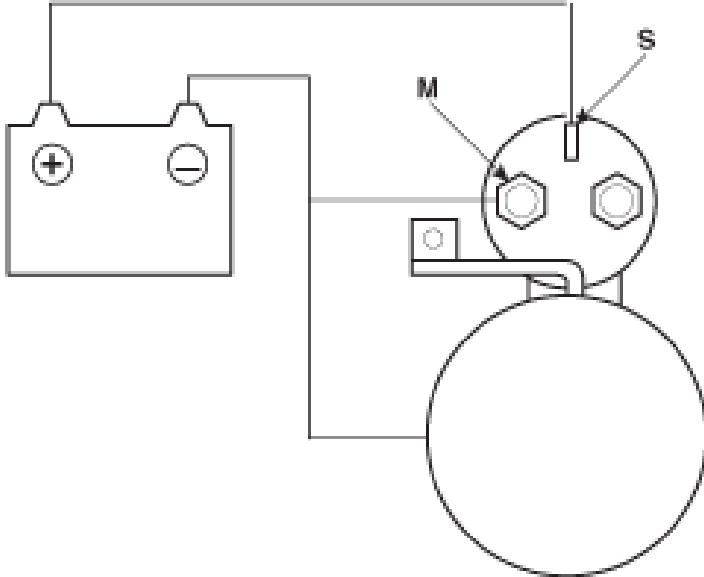


- Reassembly is the reverse of disassembly.
- Reassembly
- Reassemble in the reverse order of disassembly.
- Inspection

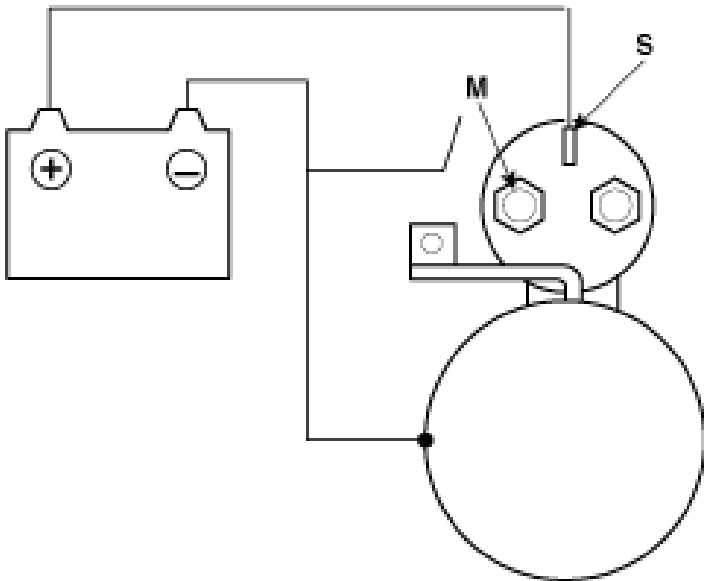
Starter Solenoid Inspection

- Disconnect the lead wire from the M-terminal of solenoid switch.

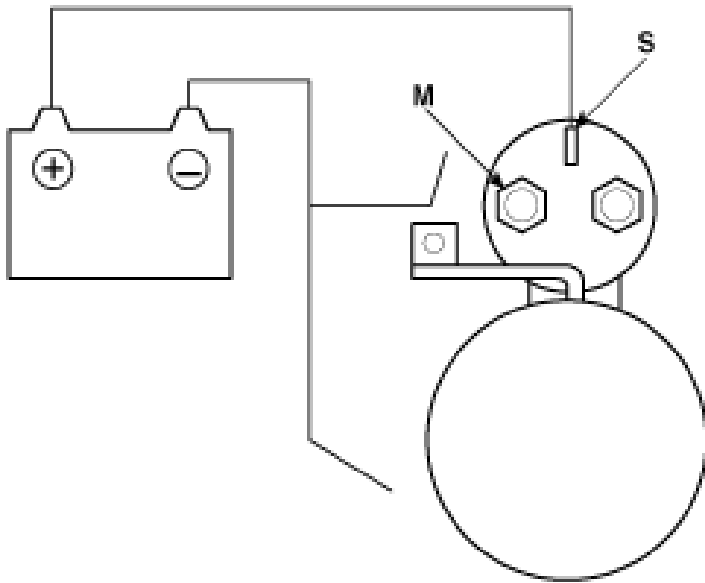
- Connect the battery as shown. If the starter pinion pops out, it is working properly. To avoid damaging the starter, do not leave the battery connected for more than 10 seconds.
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- Disconnect the battery from the M terminal. If the pinion does not retract, the hold-in coil is working properly. To avoid damaging the starter, do not leave the battery connected for more than 10 seconds.

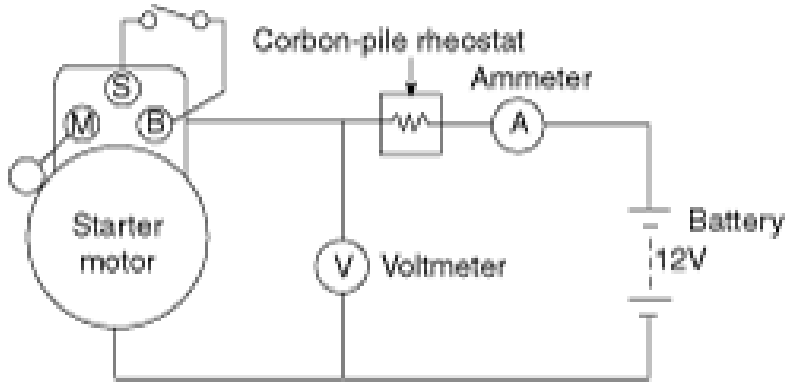


- Disconnect the battery also from the body. If the pinion retracts immediately, it is working properly. To avoid damaging the starter, do not leave the battery connected for more than 10 seconds.

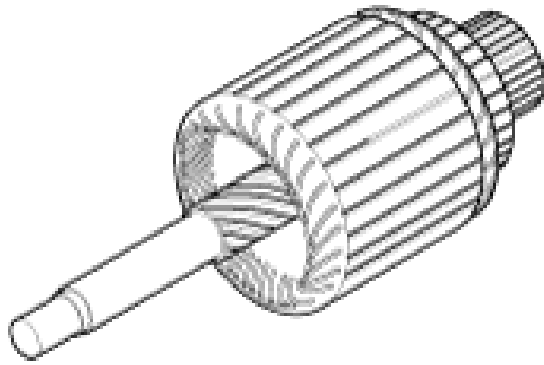


Free Running Inspection

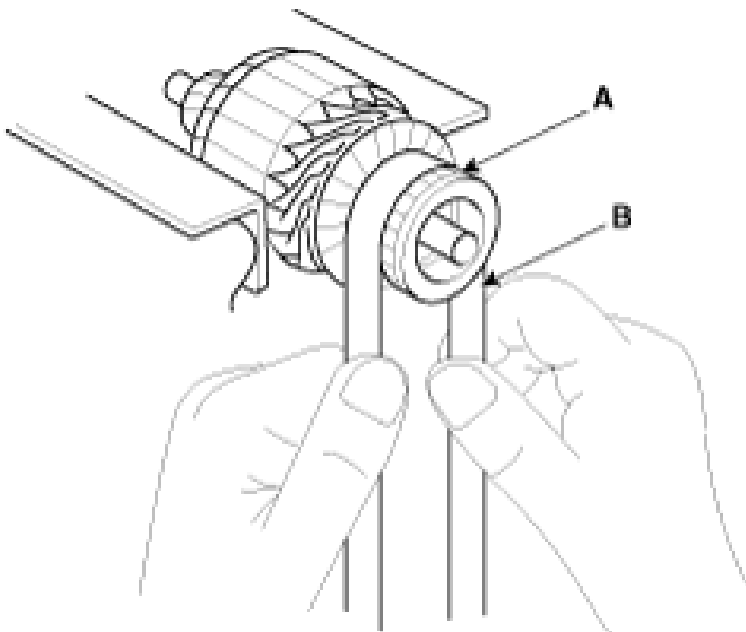
- Place the starter motor in a vise equipped with soft jaws and connect a fully-charged 12-volt battery to starter motor as follows.
- Connect a test ammeter (150-ampere scale) and carbon pile rheostats shown in the illustration.
- Connect a voltmeter (15-volt scale) across starter motor.



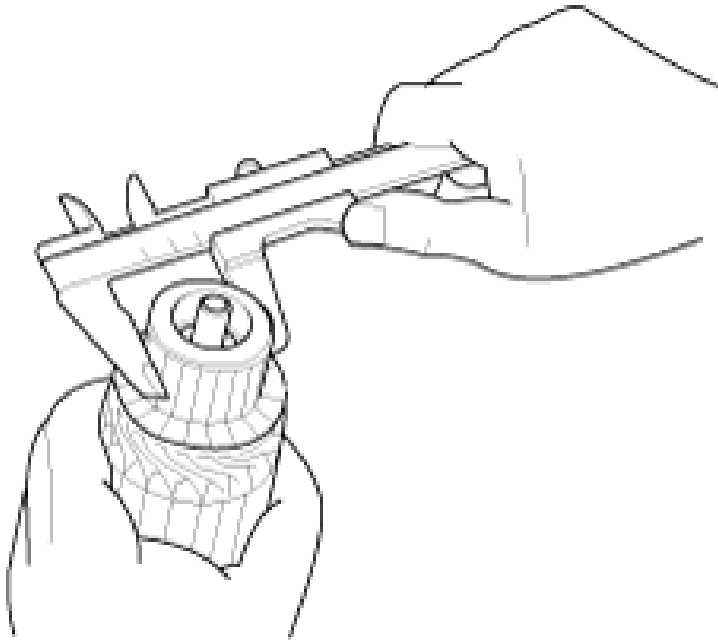
- Rotate carbon pile to the off position.
- Connect the battery cable from battery's negative post to the starter motor body.
- Adjust until battery voltage shown on the voltmeter reads 11 volts.
- Confirm that the maximum amperage is within the specifications and that the starter motor turns smoothly and freely. Current (Max.) Speed (Min.) 105 A 2,950 rpm
- Current (Max.) Speed (Min.)
105 A 2,950 rpm
- Armature
- Remove the starter.
- Disassemble the starter as shown at the beginning of this procedure.
- Inspect the armature for wear or damage from contact with the permanent magnet. If there is wear or damage, replace the armature.



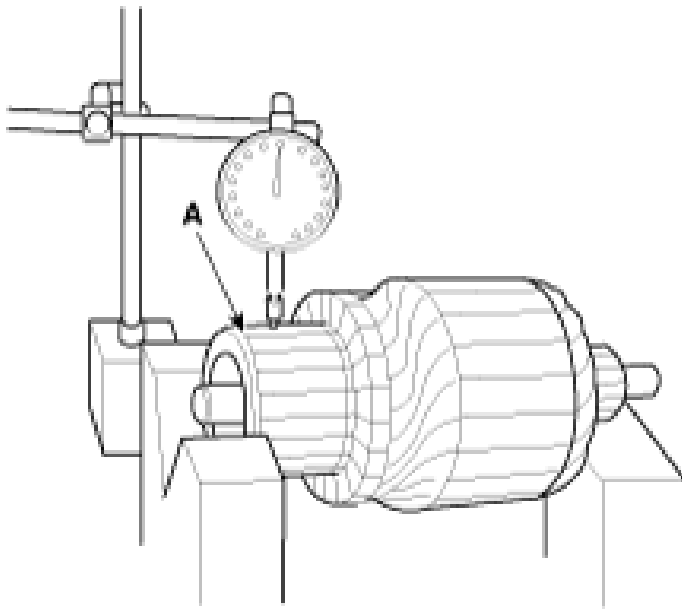
- Check the commutator (A) surface. If the surface is dirty or burnt, resurface with emery cloth or a lathe within the following specifications, or recondition with #500 or #600 sandpaper (B).



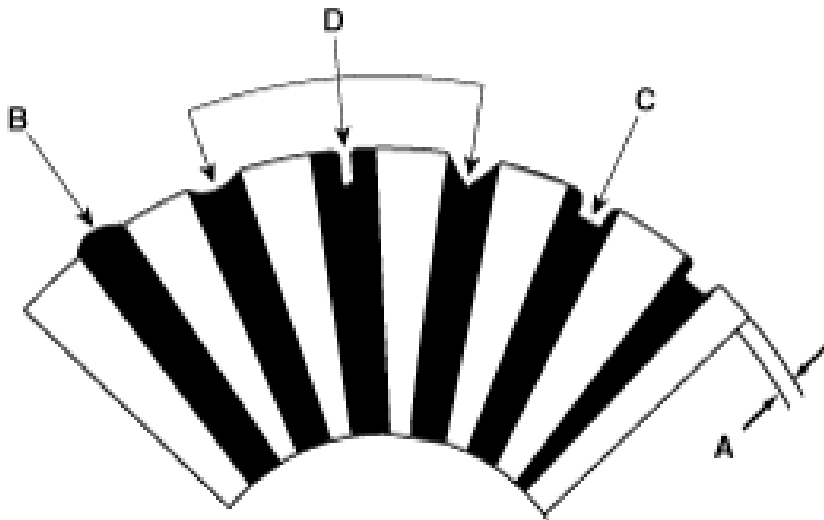
- Check the commutator diameter. If the diameter is below the service limit, replace the armature. Commutator diameter Standard (New) : 29.4 mm (1.1575 in) Service limit : 28.8 mm (1.1339 in)



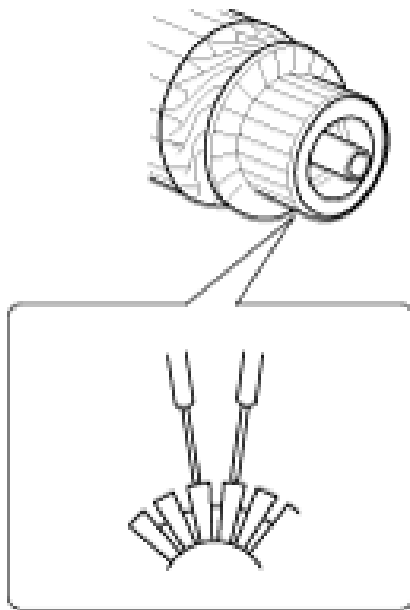
- Measure the commutator (A) runout. If the commutator runout is within the service limit, check the commutator for carbon dust or brass chips between the segments. If the commutator run out is not within the service limit, replace the armature. Commutator runout Standard (New) : 0.05 mm (0.0020 in.) max Service limit : 0.10 mm (0.0039 in.) max
- If the commutator runout is within the service limit, check the commutator for carbon dust or brass chips between the segments.
- If the commutator run out is not within the service limit, replace the armature.



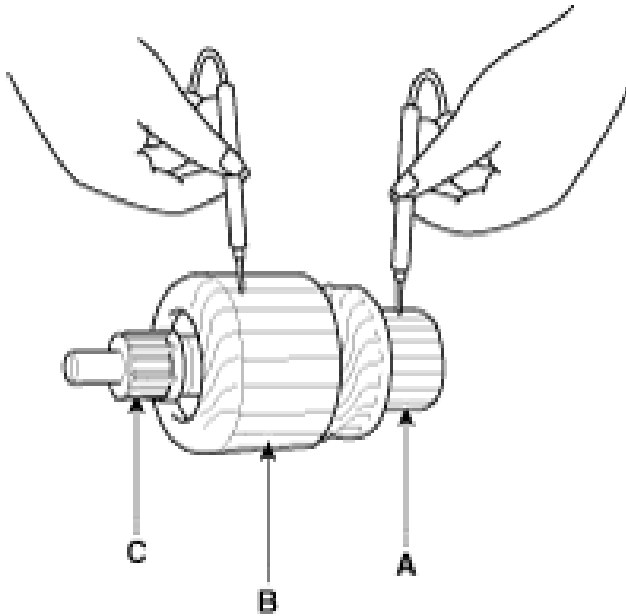
- Check the mica depth (A). If the mica is too high (B), undercut the mica with a hacksaw blade to the proper depth. Cut away all the mica (C) between the commutator segments. The undercut should not be too shallow, too narrow, or v-shaped (D). Commutator mica depth Standard (New) : 0.5 mm (0.0197 in.) Limit : 0.2 mm (0.0079 in.)



- Check for continuity between the segments of the commutator. If an open circuit exists between any segments, replace the armature.

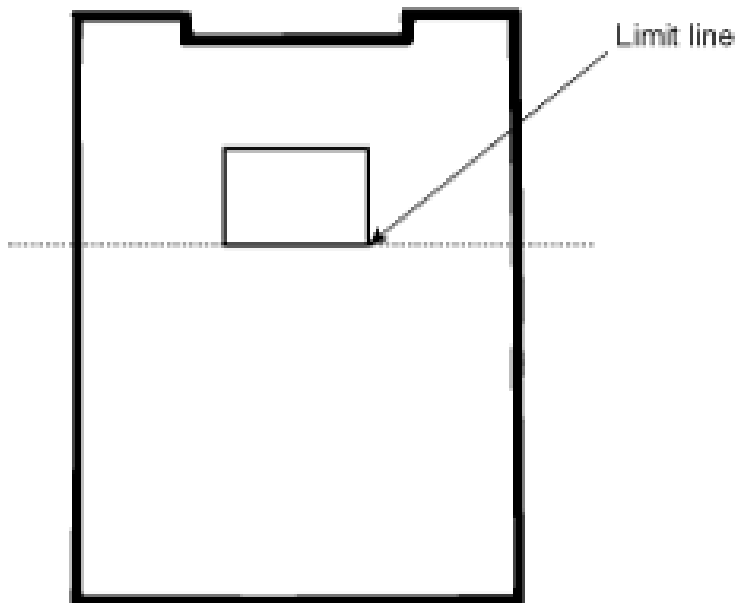


- Check with an ohmmeter that no continuity exists between the commutator (A) and armature coil core (B), and between the commutator and armature shaft (C). If continuity exists, replace the armature.



Starter Brush

- Brushes that are worn out, or oil-soaked, should be replaced. Brush length Standard : 12.3 mm (0.4843 in)
 Service limit : 5.5 mm (0.2165 in) To seat new brushes, slip a strip of #500 or #600 sandpaper, with the grit side up, between the commutator and each brush, and smoothly rotate the armature. The contact surface of the brushes will be sanded to the same contour as the commutator.

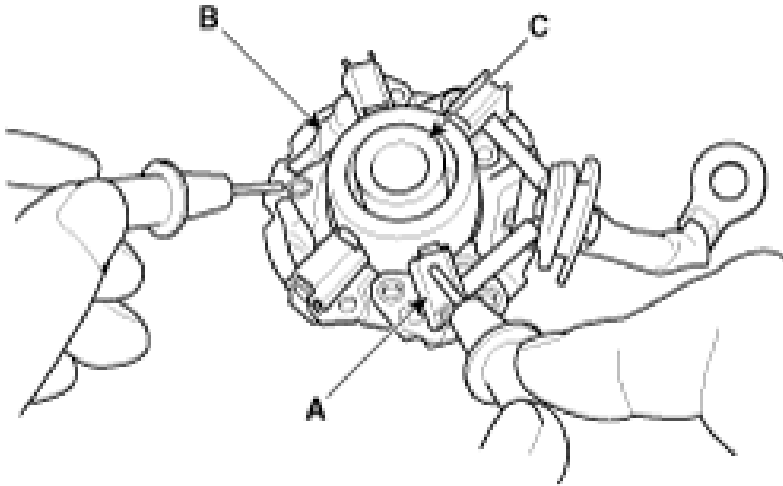


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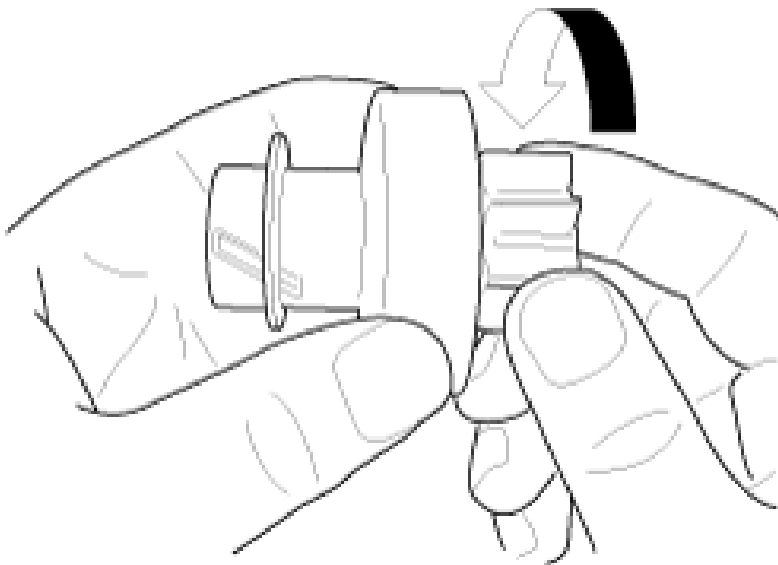
Starter Brush Holder

- Check that there is no continuity between the (+) brush holder (A) and (-) plate (B). If there is continuity, replace the brush holder assembly.



Overrunning Clutch

- Slide the overrunning clutch along the shaft. Replace it if does not slide smoothly.
- Rotate the overrunning clutch both ways. Does it lock in one direction and rotate smoothly in reverse? If it does not lock in either direction or it locks in both directions, replace it.



- If the starter drive gear is worn or damaged, replace the overrunning clutch assembly. (the gear is not available separately) Check the condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.
- Cleaning
 - Do not immerse parts in cleaning solvent. Immersing the yoke assembly and/or armature will damage the insulation wipe these parts with a cloth only.
 - Do not immerse the drive unit in cleaning solvent. The overrun clutch is pre-lubricated at the factory and solvent will wash lubrication from the clutch.
 - The drive unit may be cleaned with a brush moistened with cleaning solvent and wiped dry with a cloth.

Starter - Specifications (Article 44047)

- Specification
- | Item | Specification |
|---------------|---------------|
| Rated voltage | 12V, 1.2 kW |

The number of pinion teeth 13
Performance [No-load, 11.5V] Ampere Max. 105A
Speed Min. 2,950 rpm

Starter - Specifications (Article 44048)

- Specification
Item Specification
Rated voltage 12V, 1.2 kW
The number of pinion teeth 13
Performance [No-load, 11.5V] Ampere Max. 105A
Speed Min. 2,950 rpm