

# REMY TECHNICAL SERVICE BULLETIN

**Remy Power Products is continuously adding technical training and technical information. We welcome suggestions. If there is something technical you would like to see us add, have comments or need technical assistance, please contact us.**

## **Understanding denied warranty returns – warranty returns not related to manufacturing defects.**

Have you ever submitted a warranty or labor claim only to be surprised it's denied?

Generally when a claim is denied it's for one of two reasons:

- Product doesn't exhibit signs of failure
- Failure is not covered under warranty

There are several external factors that lead to product failure:

- Battery malfunction
- Improper installation
- Incorrect application
- Vehicle control circuit problems

The following are the most common issues for potential starting motor and alternator failures. Let's look at how you may be able to prevent them when they arise.

### **1. Battery**

The battery is the primary cause of electrical system malfunctions.

Perform a visual inspection of the battery and cables. Look for corrosion build up and loose connections at the cable ends.

Loose or corroded battery connections will result in low circuit voltage.

Corrosion build up (white/green substance) on the cables to battery connections will result in low circuit voltage (voltage drop).

- This excessive resistance can create a slow crank (slow crank or no crank) situation resulting in high current draw and damage to the starting motor.
- Voltage drop restricts the alternator's ability to sustain vehicle requirements, resulting in discharged batteries, loss of vehicle electrical loads and eventually alternator failure.

**Battery Life Cycle** Batteries are perishable devices that wear out at some point in time. With use, they gradually deteriorate and become less capable of performing their important job. New and/or good batteries can become discharged for various reasons.

- A battery having a low or poor state of charge will place abnormal stresses on the starting and charging system.
- When battery voltage is low, starter amperage draw is high, creating heat in the starter and cranking circuit.



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# Starter Motor: Understanding Root Causes of Suspected starting motor failures.

## 2. Milled Pinion

If milling is observed on the starter drive it is almost certain that similar damage may occur to the vehicle's flywheel. Inspect the entire circumference of the flywheel for damaged teeth. Placing a new starter on a vehicle with a damaged flywheel will result in no-crank and possibly another damaged starter.



### Possible Causes

- Alignment problems (to shim or not to shim), due to variations in engine block machining. Shims (GM applications) may be required to properly align the starter drive teeth with the engine flywheel teeth.
- Improper torque on mounting bolts. Hand tighten both mounting bolts first before applying torque. Applying full torque to one mounting bolt before securing the other mounting bolt can cause binding, not allowing the starting housing to fully seat to the engine block.
- Engine flywheel teeth damaged. It's always a good practice to inspect the flywheel for damaged teeth before installing a new starter. Installing a new starter on an engine with damaged flywheel teeth can result in milling and/or a no-crank situation.
- Control circuit problems. A defective key switch or external solenoid can intermittently apply power to the starter solenoid, resulting in unwanted starter engagement while the engine is running.

## 3. Impact Loading, Side Loading and Starter Housing Damage

**Impact loading** occurs when power is suddenly cut from the starter solenoid while the starter drive is engaged to the vehicle flywheel and cranking the engine over (but engine is not yet started).

The engine will seek the natural piston rest position and will turn the flywheel backwards while the flywheel teeth are still in mesh with the starter drive teeth. This violent action turns the starter drive in the opposite direction. This force may break the drive housing or shatter the drive pinion teeth. This condition can also occur when ignition timing is incorrect, causing the engine to rock back before top dead center during cranking.



**Side loading** occurs when the starter is not properly installed to the engine block (loose or binding). During the crank cycle, the starter is attempting to turn the engine over. If the housing of the starter is loose or misaligned, the starter drive is forced to walk over the engine flywheel teeth. This violent action creates severe side loading on the starter housing and engine mounting surfaces. This action can cause the starter nose housing or engine block mounting area to fracture.



**Starter housing damage** can also occur by over torquing or uneven torquing when being installed.

### Possible Causes

- Engine fuel or ignition start problems.
- Improperly torqued, unevenly torqued, bent or worn mounting bolts.
- Malfunction Indicator Lamp indicates camshaft and /or crankshaft sensor performance.
- Clutch switch or Neutral safety switch problems (switch cuts power to the starter in the middle of the crank cycle).

## 4. Oil Contamination

### Possible Causes

- Petroleum is an insulator. Brushes that come into contact with oil will coat the commutator, causing the connection to become insulated. This can stop the circuit from completing and cause a malfunction.
- Possible leaks include: valve cover, rear main seal, power steering line and/or intake gasket.
- The ground path for the starter is the nose housing, oil or any other foreign material can impede the electrical flow, resulting in misdiagnosis of premature starter failure.

SYMPTOM	POSSIBLE CAUSE	ACTION NEEDED
<b>Engine will not crank</b>	<ul style="list-style-type: none"> <li>• Dead battery</li> <li>• Defective fusible link</li> <li>• Loose connections</li> <li>• Defective ignition switch</li> <li>• Defective solenoid/mag switch, relay, neutral start switch or clutch switch</li> <li>• Mechanical problem in engine</li> <li>• Problem in vehicle anti-theft system</li> </ul>	<ul style="list-style-type: none"> <li>• Check battery state-of-charge</li> <li>• Replace fusible link</li> <li>• Clean and tighten connections</li> <li>• Check switch operation, replace as needed</li> <li>• Check and replace as needed</li> <li>• Check engine</li> <li>• Check service manual for system tests</li> </ul>
<b>Engine cranks too slow</b>	<ul style="list-style-type: none"> <li>• Weak battery</li> <li>• Loose or corroded connections</li> <li>• Defective starter motor</li> <li>• Mechanical problem with engine</li> </ul>	<ul style="list-style-type: none"> <li>• Check battery state of charge</li> <li>• Clean and tighten connections</li> <li>• Test starter</li> <li>• Diagnose engine problem and repair</li> </ul>
<b>Starter keeps running</b>	<ul style="list-style-type: none"> <li>• Damaged pinion or ring gear</li> <li>• Defective starter or magnetic switch</li> <li>• Defective ignition switch or control circuit</li> </ul>	<ul style="list-style-type: none"> <li>• Check gears for wear or damage</li> <li>• Test starter, and Magnetic switch</li> <li>• Check switch and circuit components</li> </ul>
<b>Starter spins, but engine will not crank</b>	<ul style="list-style-type: none"> <li>• Defective drive clutch</li> <li>• Defective starter motor</li> </ul>	<ul style="list-style-type: none"> <li>• Rotate pinion by hand, it should not go both ways</li> <li>• Test motor and verify drive extension</li> </ul>
<b>Starter does not engage or disengage properly</b>	<ul style="list-style-type: none"> <li>• Defective solenoid/mag switch</li> <li>• Damaged or worn pinion gear or ring gear</li> </ul>	<ul style="list-style-type: none"> <li>• Bench test starter, if passes check external switches/ control circuit</li> <li>• Check teeth on both drive and ring gear</li> </ul>

## Alternator: Understanding Root Causes of Suspected Alternator Failures.

### 5. Loose Electrical Connections

Inspect all electrical connections for evidence of being loose, broken, stripped or cross-threaded during installation. When the connection is not tightened to the proper torque, evidence of corrosion or arcing (burning) will be present on contact surfaces that should be clean.

#### Possible Causes

- Any electrical connections that exhibit signs of being broken, stripped and/or cross-threaded terminals.
- Evidence of loose electrical connections can show arcing & burning. Arcing will show on washers, nut clamping surfaces and terminal threads.
- A loose connection many times will melt the insulator and loosen the stack-up, allowing the output terminal to overheat and short to ground.
- Over torqueing of B+ stud nut.



### 6. Pulley Discoloration or Bluing

A loose or worn belt will slip on the pulley, transferring visible heat on the pulley surface. If the belt is loose, the alternator will not spin fast enough. This will not allow the alternator to provide electrical current needed to sustain the vehicle's demands.

#### Possible Causes

- Loose or worn belt
- Improper tension due to defective belt tensioner
- Belt misalignment
- Loose alternator mounting



### 7. Unusual Environmental Conditions

Inspect for dirt, oil, or other foreign material that can restrict air flow for cooling. If the alternator is not being cooled properly, the result will be overheating and early life failure. If the cooling fins are plugged >60%, the alternator is not being cooled properly.

It is a good practice to blow cooling fins clean with compressed air.



### 8. Contaminated Regulator Connection

Inspect for rust and/or corrosion build up on the regulator blade terminals connecting into vehicle harness. Rust or corrosion can create a voltage drop or intermittent open connection resulting in no output or intermittent alternator output.

#### Possible Causes

- Missing or defective O-ring on vehicle regulator harness plug
- Crack in the alternator regulator plug receiver
- Using an alternator that has been sitting outside in the environment uncovered for a prolonged period of time before installing in vehicle.
- Oil saturation around the alternator harness causing O-ring deterioration
- Excessive heat around the alternator harness causing O-ring fatigue



### 9. Improper Installation

Hand tighten the mounting bolts first before applying torque. This will help eliminate binding and unwanted stress on the housing to help eliminate broken mounting flanges. Excessive torque can also result in this failure mode.

Prying on the unit during installation or removal can cause severe damage to the casting and internal components.



### 10. Extra Customer Parts

During installation if a nut, bolt, washer or any other foreign part drops into the alternator, it must be removed before the battery is connected or the unit will fail.



SYMPTOM	POSSIBLE CAUSE	ACTION NEEDED
No output from alternator. Battery condition good. (Dashboard indicator light illuminates when key on engine off)	<ul style="list-style-type: none"> <li>• Drive belt broken or loose</li> <li>• No voltage signal to field through regulator plug</li> <li>• Voltage not present at Alternator B+ terminal</li> </ul>	<ul style="list-style-type: none"> <li>• Replace or tighten belt</li> <li>• Check regulator plug for corrosion or melting (replace pigtail if necessary)</li> <li>• Check fusible links and wire going to B+ terminal</li> </ul>
Dash board charging indicator does not light while key on engine off	<ul style="list-style-type: none"> <li>• Blown fuse or fusible link</li> <li>• Light bulb burnt out</li> </ul>	<ul style="list-style-type: none"> <li>• Check and replace fuses as needed</li> <li>• Replace charging indicator light bulb</li> </ul>
Low voltage output from alternator	<ul style="list-style-type: none"> <li>• Corroded or loose connections</li> <li>• Drive belt slipping</li> <li>• Belt tensioner weak</li> </ul>	<ul style="list-style-type: none"> <li>• Clean and tighten connections and perform voltage drop test</li> <li>• Use test gage on belt to determine if replacement is needed</li> <li>• Check tensioner alignment marks for weakness</li> </ul>
Lights dim at idle while all accessories are off	<ul style="list-style-type: none"> <li>• Cables corroded</li> <li>• Improper body ground</li> <li>• Drive belt slipping or tensioner is weak</li> <li>• Improper engine rpm's at idle</li> <li>• Weak or defective battery</li> </ul>	<ul style="list-style-type: none"> <li>• Clean and tighten connections and perform volt drop testing</li> <li>• Clean and tighten body ground</li> <li>• Check belt and tensioner for excessive wear</li> <li>• Refer to manufacture specifications and repair as needed</li> <li>• Test battery and replace as needed</li> </ul>

**Need help? Contact Technical Support at 800-854-0076.**

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