

Heavy Duty Warranty Support Guide





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BorgWarner understands that providing warranty support is a very important reason why you specify the use of Delco Remy products.

This ***Warranty Guide*** is a great tool to help you process Delco Remy Heavy Duty warranty. The objective of this Warranty Guide is..

- To identify all of the steps necessary to process warranty claims correctly.

- To educate your service department on making warranty decisions prior to processing.



Warranty Essentials

Before attempting to process warranty on Delco Remy brand products, be sure you have the required vehicle and customer information. To submit warranty, use the appropriate OEM warranty program or go to www.delcoremywarranty.com.



Products returned to the BorgWarner Reliability Center will fall under one of three categories.

Trouble Not Found: Product does not exhibit signs of failure and is considered in working condition.

Non-Warrantable: Product failed due to reasons that include, but not limited to, customer damage, miss-application, or product submitted beyond date and mileage limitations.

Warrantable: Product failed due to manufactures defect or workmanship within the established warranty period.



Vehicle Electrical System Integrity

Sometimes a vehicle has electrical problems that results in a perceived failure of a starter or alternator. Some vehicle electrical problems are known to cause starters or alternators to fail.

We understand that as a dealer or distributor you are not authorized to open a unit to pre-determine failure. However, Delco Remy has available the necessary tools to diagnose an electrical system prior to product removal.

This Warranty Guide will help you understand the warranty determination process when the product arrives at the Delco Remy Reliability Center.



Checks Battery, Alternator, and Cable voltage Drop

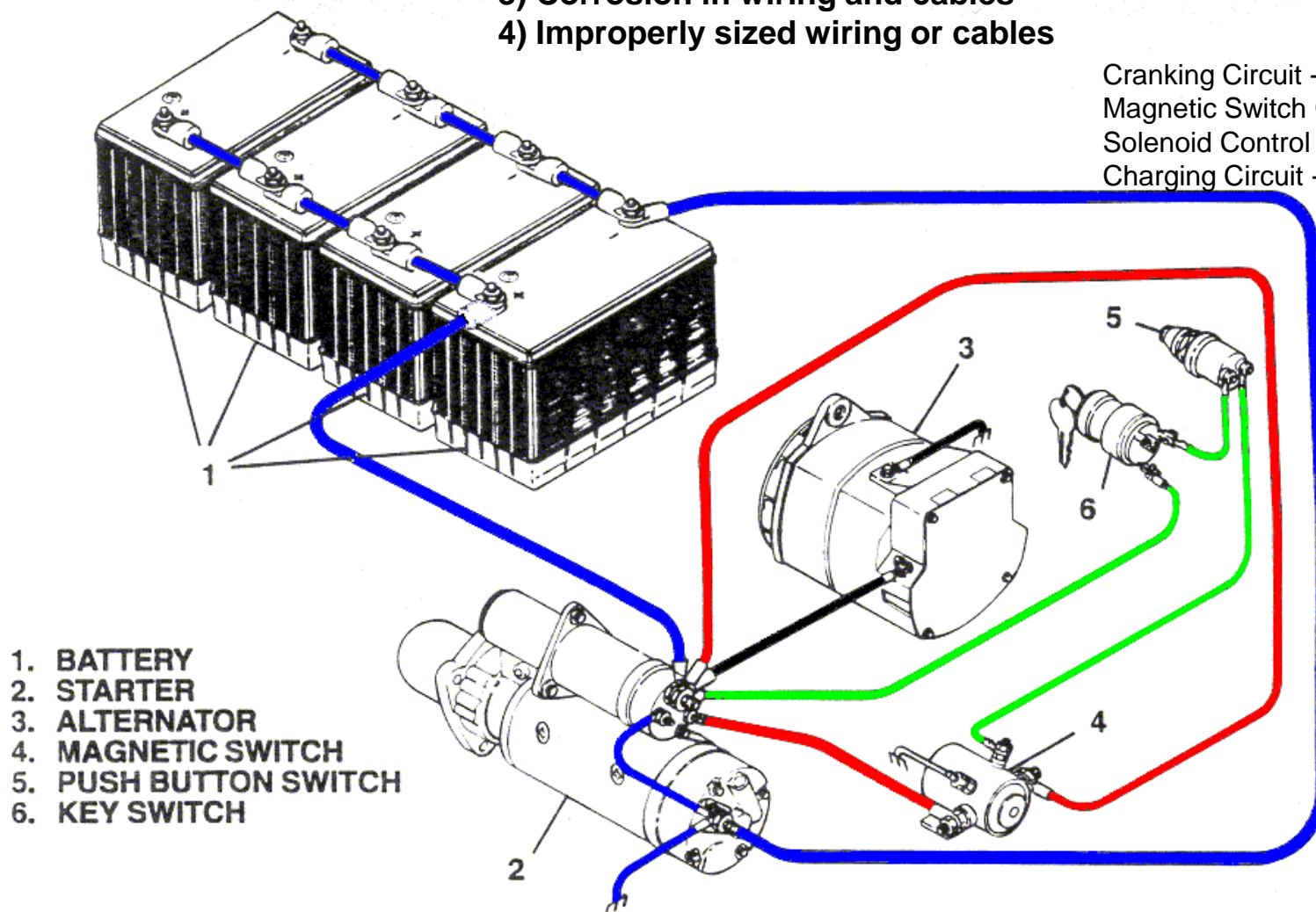
BorgWarner Inc.

Revised: February 2017, p 6

**High resistance is the enemy of the cranking system.
Four main situations will lead to cranking motor problems:**

- 1) Low battery voltage**
- 2) Loose connections**
- 3) Corrosion in wiring and cables**
- 4) Improperly sized wiring or cables**

Cranking Circuit - Blue
Magnetic Switch Control Circuit - Green
Solenoid Control Circuit - Red
Charging Circuit - Blue/Black





Warranty Determination - Starters

Starting motors are analyzed by a guided procedure that follows these steps.

- 1) Solenoid coil, IMS and OCP resistances & continuity are checked using ohm / multi meter.
- 2) If electrical checks are ok, starter is tested on solenoid tester to verify operation.
- 3) Load test is then performed to verify starter speed, current, torque, and commutation current.
- 4) Once all parameters are tested to specification and are within the limits, a solenoid teardown is performed. Contact disc is inspected for unusual arcing and wear.
- 5) Motor teardown is then performed, and components are ground checked, inspected for unusual wear, and all electrical connections are checked for intermittent conditions.
- 6) If all test and inspections meet specification unit is coded as Trouble Not Found (TNF).

Examples of Non-Warrantable Products

Starters



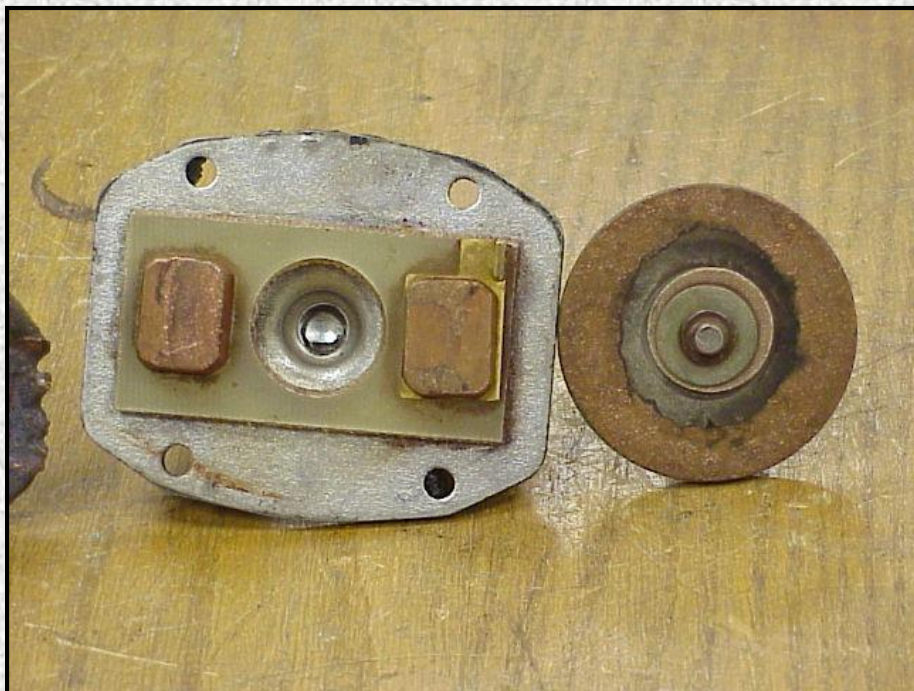
Non-Warrantable



Burnt contact discs are the result of high resistance in the control circuit.

Example of Stuck Contact Disk

Non-Warrantable

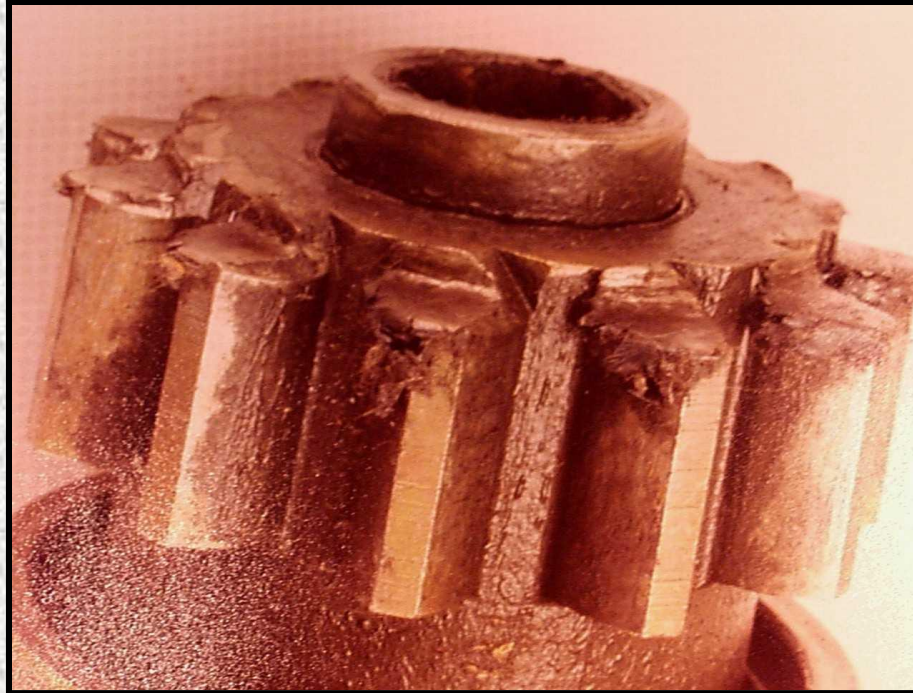


Normal Wear



Damaged – Caused by low system voltage

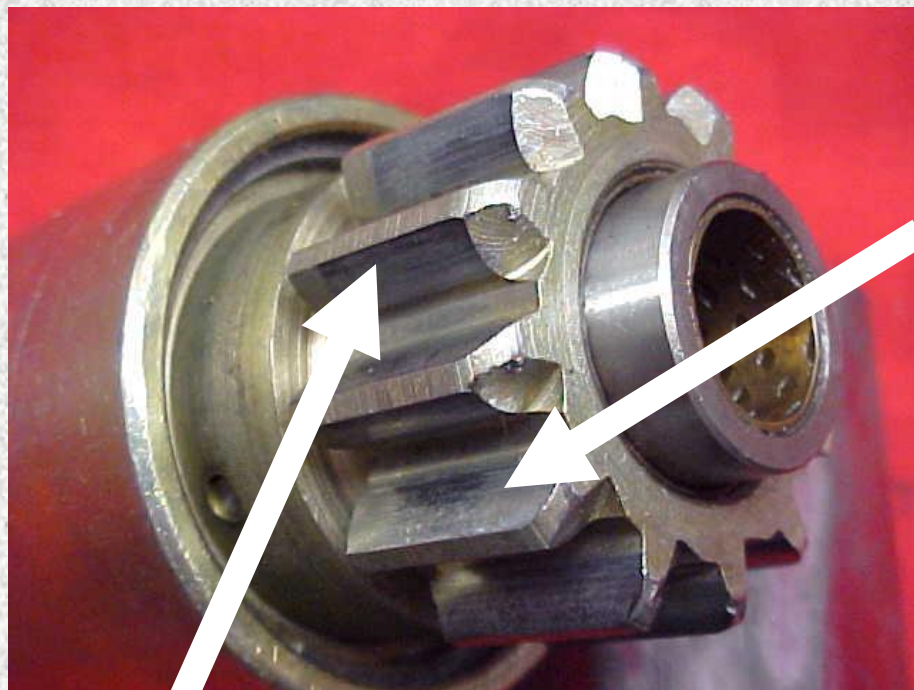
Non-Warrantable



Milled Pinion / Engagement Milling. The burrs are toward the pressure side of the tooth, this means the pinion was engaged into a rotating ring gear. If the burrs were toward the non-pressure side of the tooth, the pinion was engaged into a stationary ring gear.

Non-Warrantable

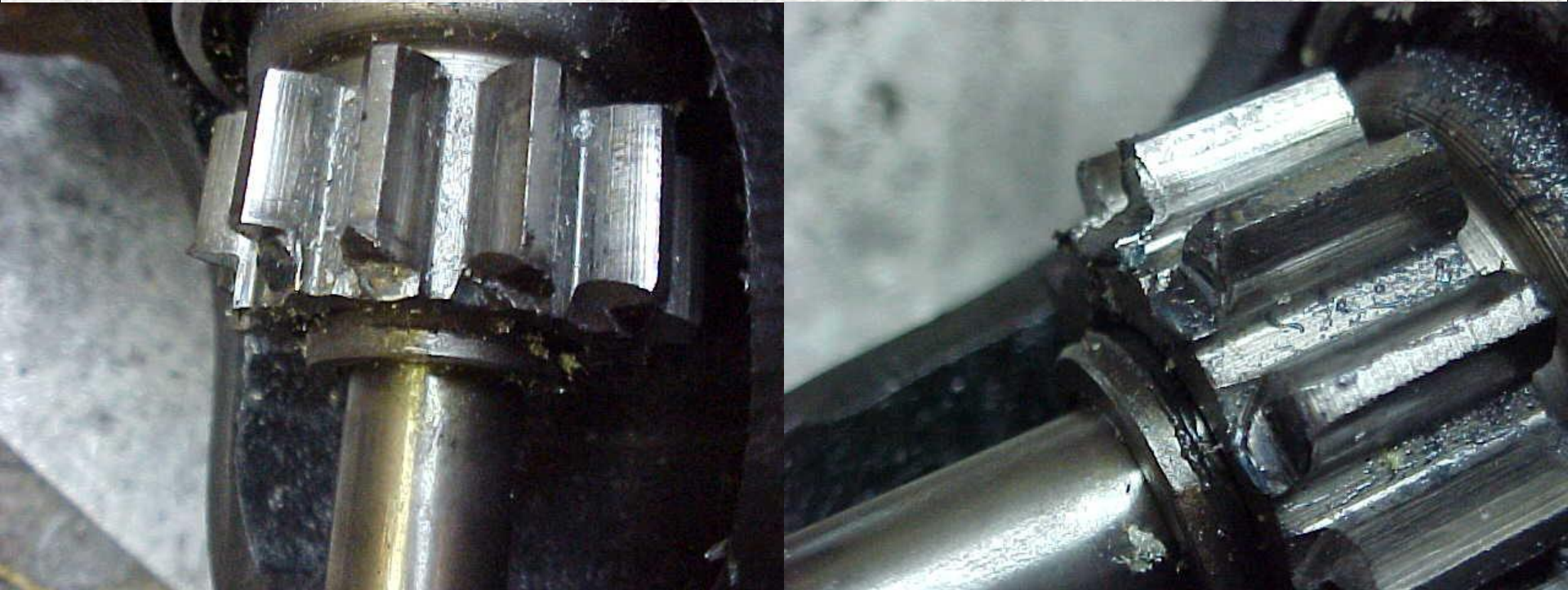
Drive Assembly Pinion Gear Engagement Milling



**Pressure (Non-Beveled)
or Crank Side of Pinion
Tooth. With burr in this
direction, starter
engaged
to running ring gear of
engine.**

Non-Pressure (Beveled) or Over-run Side of pinion tooth. With burr in this direction, starter running prior to pinion mesh with ring gear of engine. Code would then be Engagement Milling.

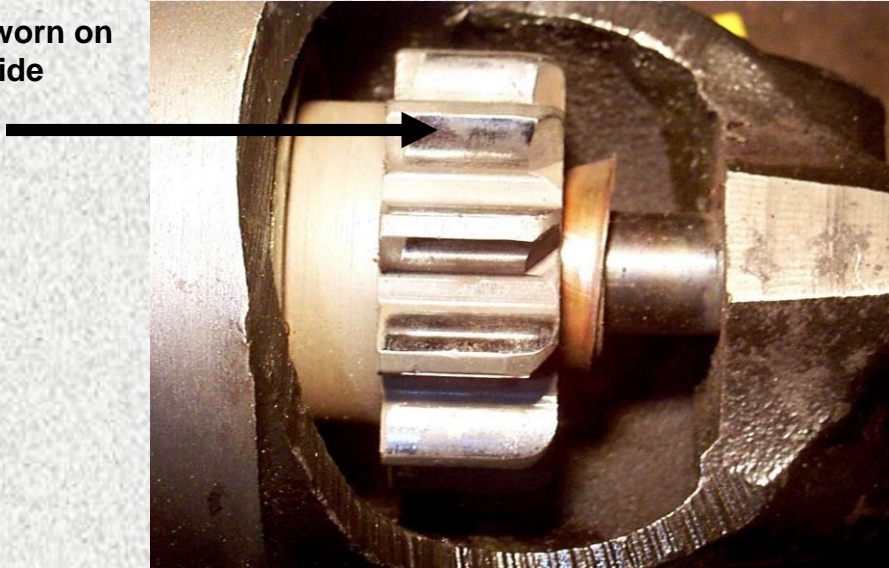
Non-Warrantable



Drive Assembly : Engaged with Running Ring Gear

Non-Warrantable

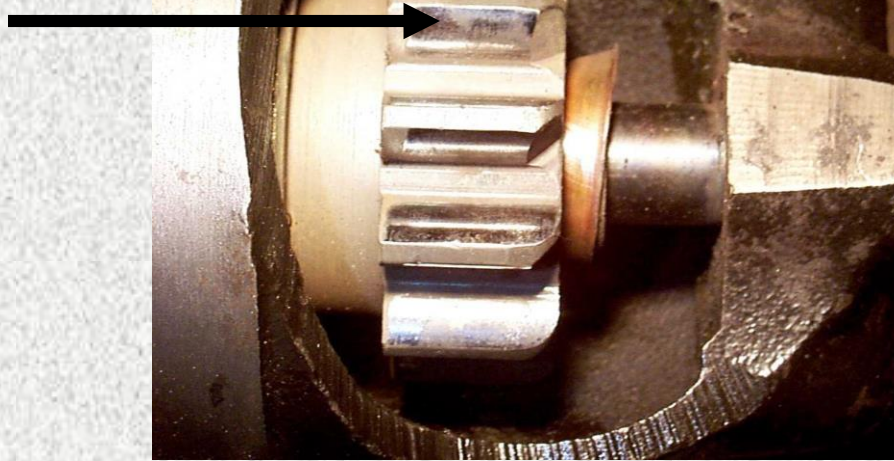
Pinion tooth in worn on
Over Run Side



Starter Over Run/ Stuck Pinion. This occurs when power is supplied to the switch terminal or a mechanical interference between the pinion and the ring gear. As a result, the pinion stayed engaged into the ring gear. Instead of the pinion turning the ring gear, the ring gear is turning the pinion continuously.

Non-Warrantable

Pinion tooth in worn on
Over Run Side



Twisted damaged splines/ Fractured shaft / Rock back Fracture.

This occurs when the starter stayed engaged due to a mechanical interference between the pinion and the ring gear or an engine rock back. As a result, engine rock back will cause the damage to spline or shaft fracture. In more sever cases, the nose housing will fracture.

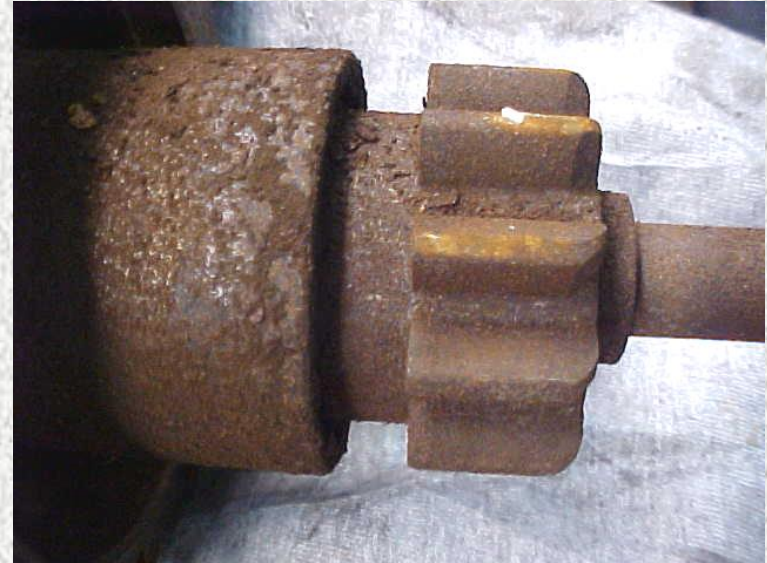
Non-Warrantable



Wiping on
non-pressure
side of pinion
gear tooth

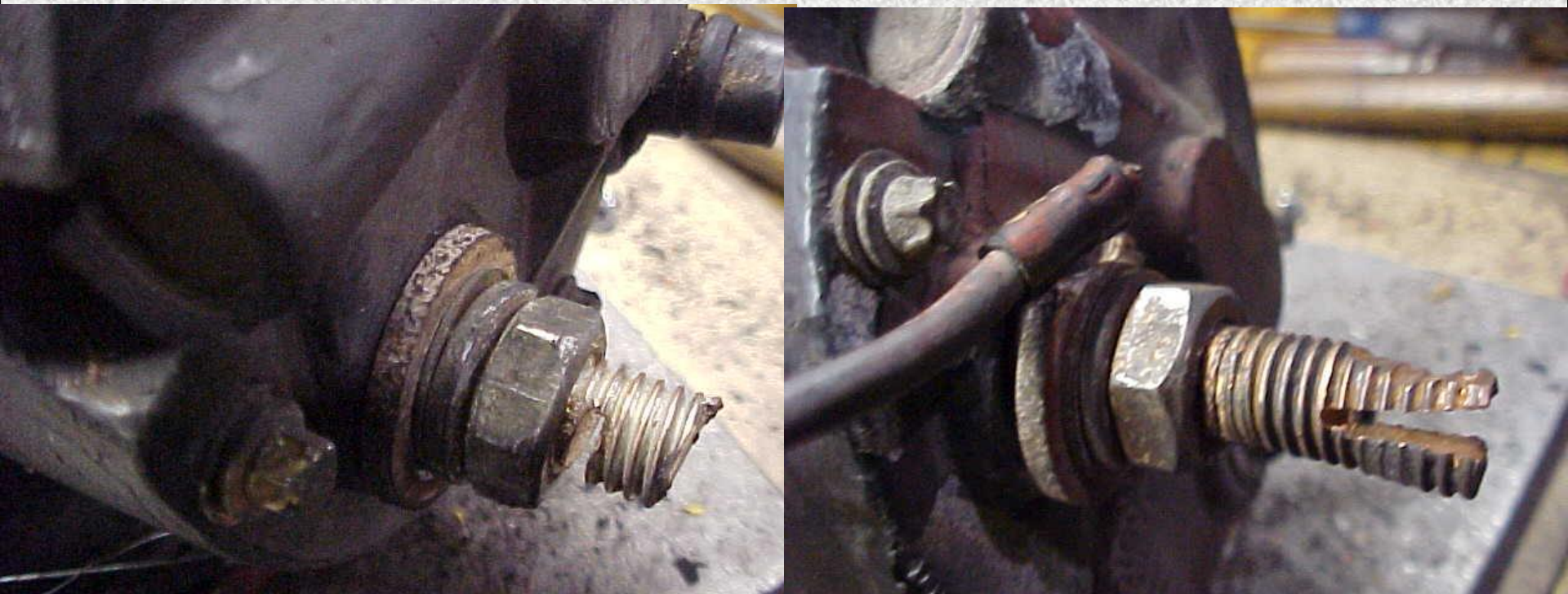
**Starter Over Run/ Stuck Pinion/
Twisted damaged splines/ Fractured
shaft.** continued

Non-Warrantable



Armature Contamination / Corrosion: Drive sticks and is difficult to move. High humidity level in flywheel housing due to improper venting/draining forming a corrosive environment, possibly in combination with corrosive agents, such as road salt. This causes extreme corrosion on the armature shaft and drive assembly increasing friction and preventing free drive movement. Repeated starting attempts cause discoloration on solenoid coils or cause them to burn open. If the starter is located low on the engine with the nose housing opening facing up, the situation may be aggravated.

Non-Warrantable



**Customer Damage to Unit
Upon Removal of Starter from Engine:
Inability to connect ground connection to
starter while testing.**

Non-Warrantable



Solenoid B+ Terminal : Cross-Threaded

Non-Warrantable



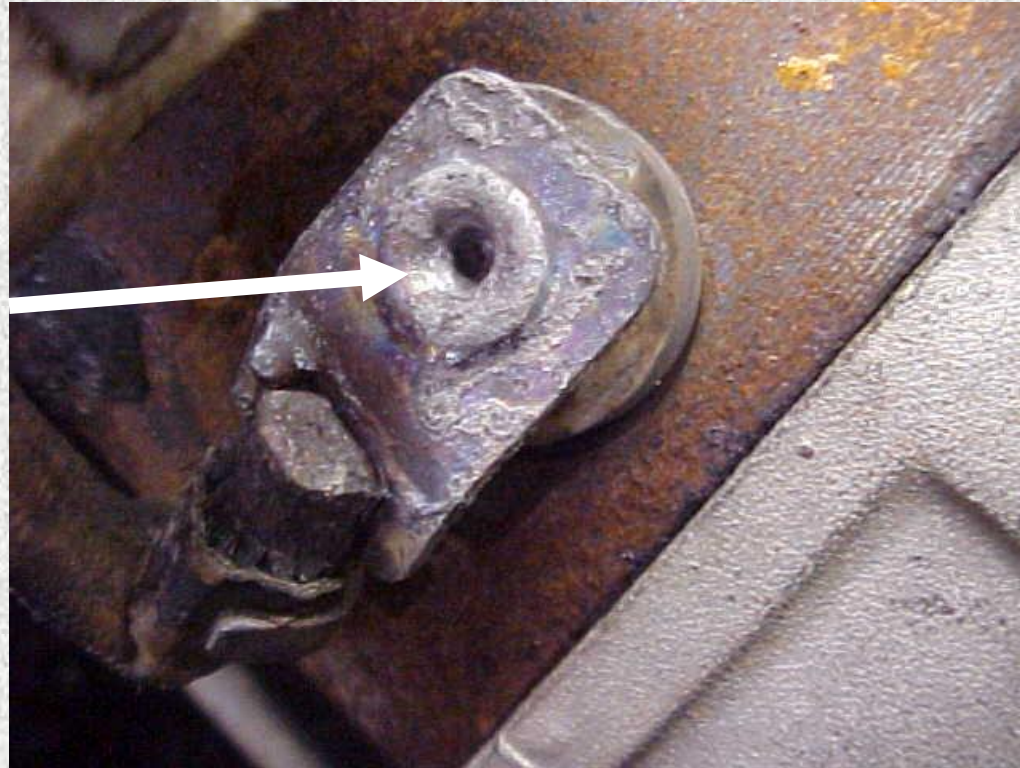
Solenoid Cap : Fractured

Non-Warrantable



Customer Disassembled or Modified Unit

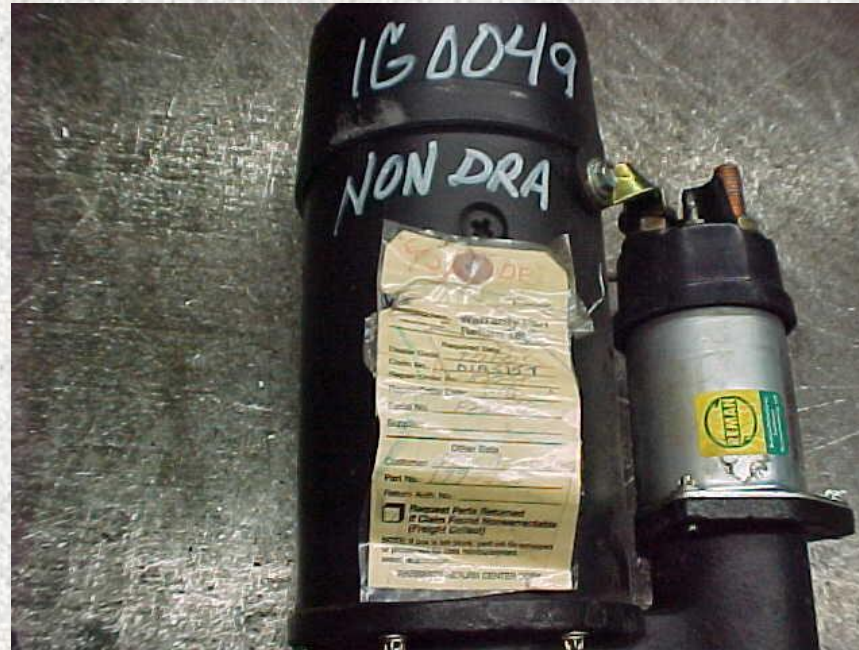
Non-Warrantable



Extreme heating
Melted solder
Connection to
Motor field terminal

**Starter Motor : Over cranked unit
(Extended Engagement)**

Non-Warrantable



**Non - Delco Remy Manufactured or
Remanufactured Unit**

Non-Warrantable (PG Starters)



Solder re-flow due to excessive heat



Good Solder on Solenoid

Prolong Power applied: Prolong power supplied to the pull-in coil is caused by Customer ring gear damage, attempted engagement into running engine, or high control circuit resistance creating insufficient soft-start torque thus not allowing the pinion to clear abutment while attempting to crank the engine

Non-Warrantable (PG Starters)



Melted varnish will flow from the starter and become black from heat.



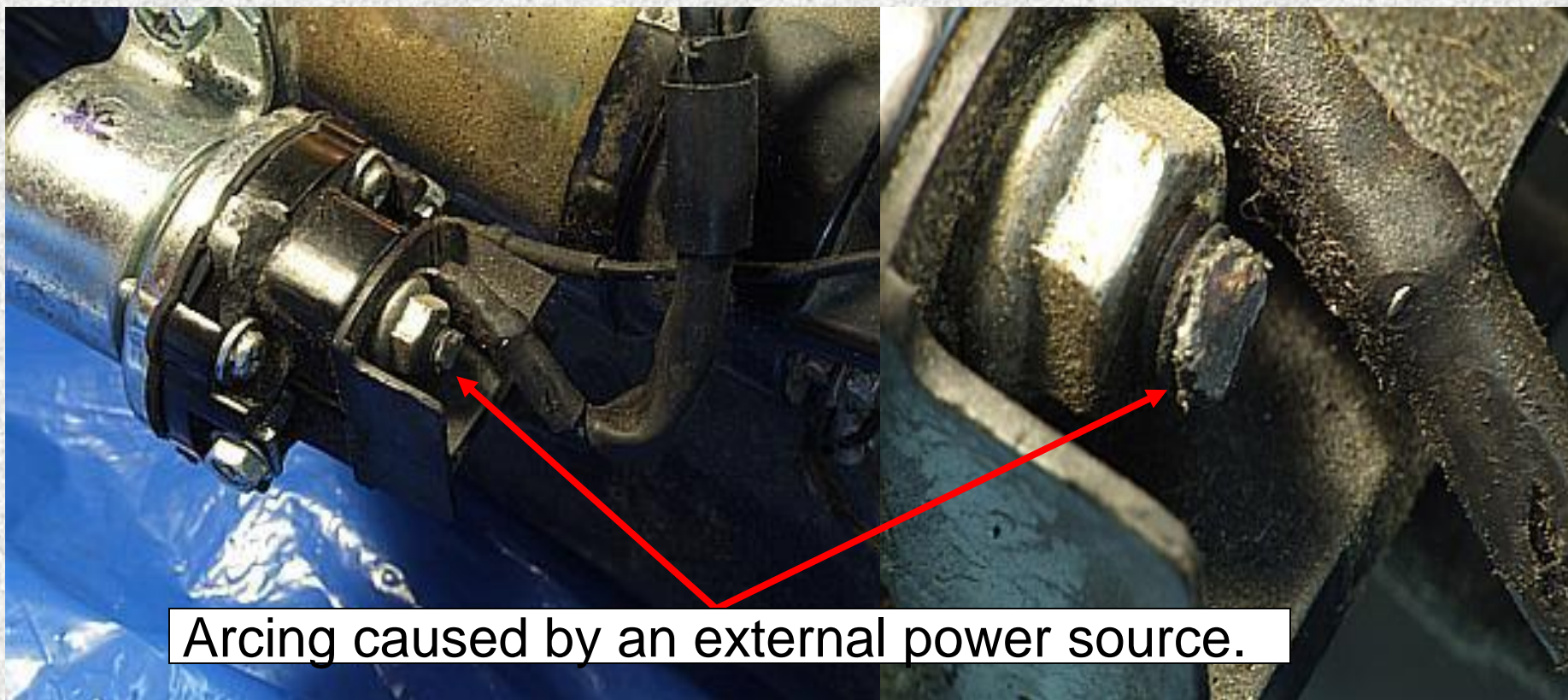
Motor strap insulator discolored by over-crank.



non-discolored motor strap insulator for reference.

Over Crank: Over-cranked starters are not warrantable, because the operator caused the failure by the holding the ignition switch for too long when the engine would not start.

Non-Warrantable (PG Starters)

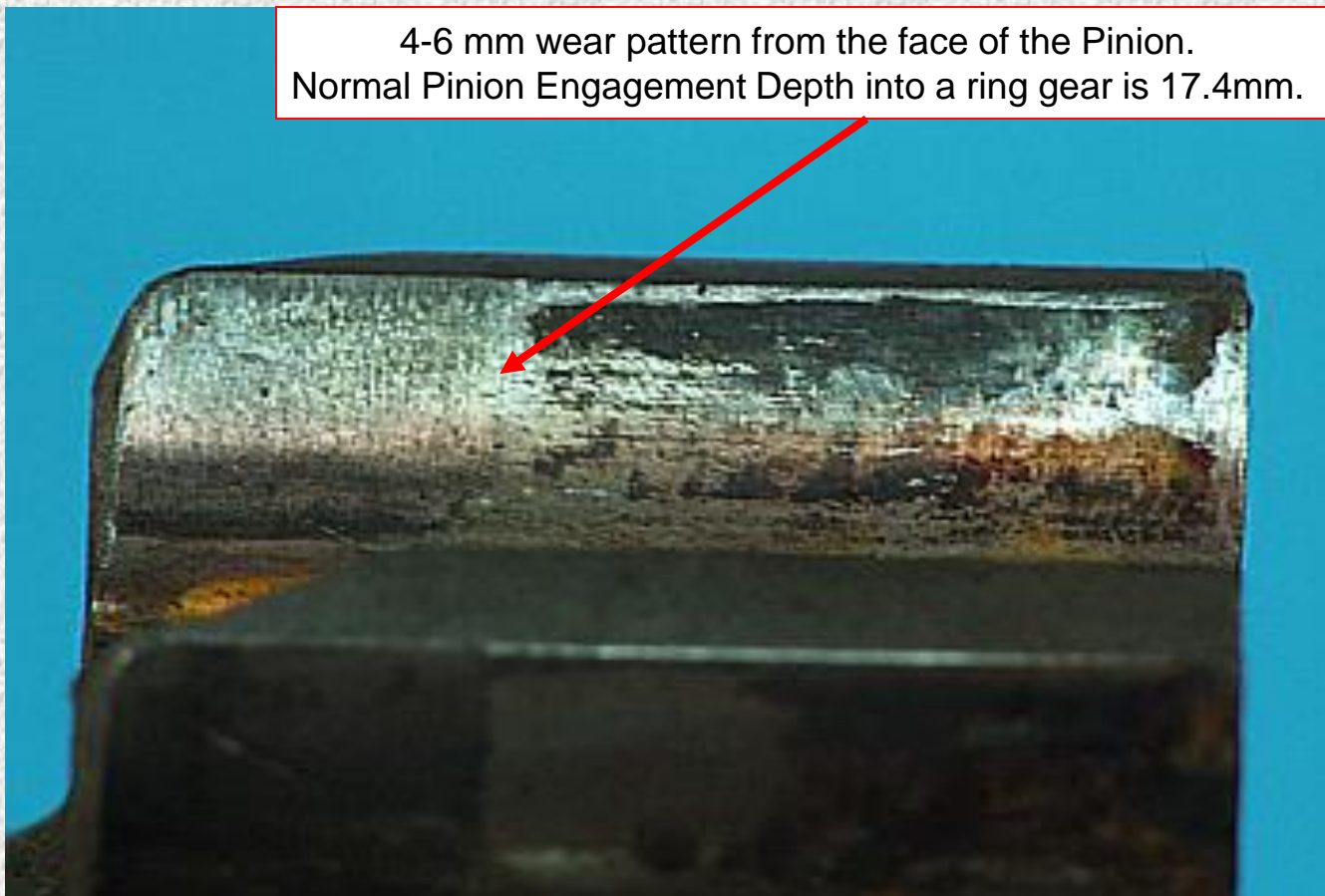


Arcing caused by an external power source.

IMS- External Power applied to the
IMS Terminal.

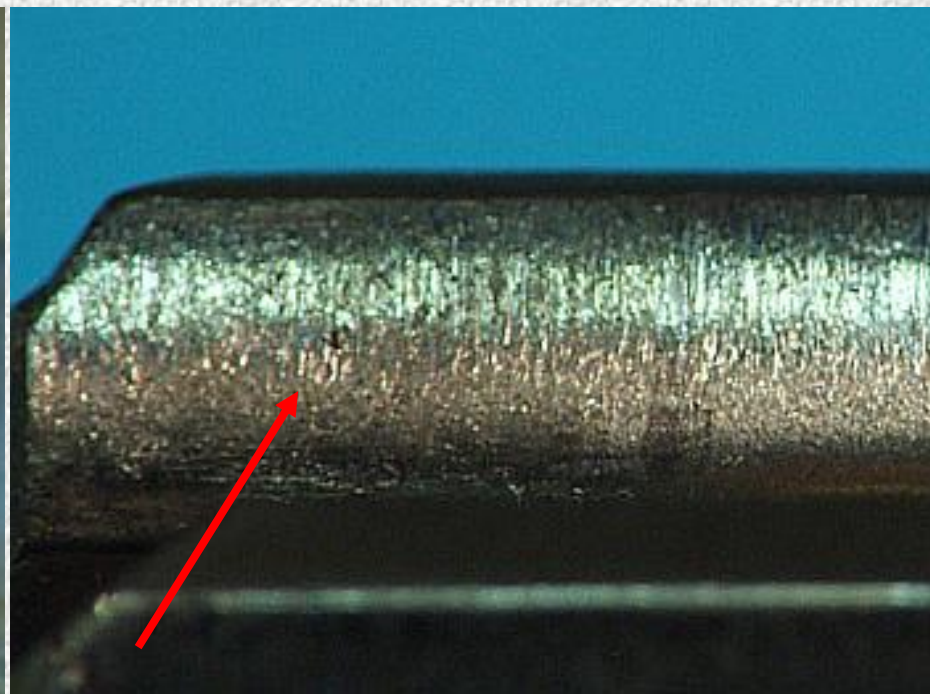
Non-Warrantable (PG Starters)

4-6 mm wear pattern from the face of the Pinion.
Normal Pinion Engagement Depth into a ring gear is 17.4mm.



Drive Asm - Vehicle Ring Gear Axial Position
Too Close due to required spacer not installed.

Non-Warrantable (PG Starters)



Customer - Ground Connection Loose/High Resistance. The photo on the left shows vehicle negative battery cable was touching the CE. Photo on the right of electrical arcing on the pinion teeth from high ground return current.



Warranty Determination - Alternators

Alternators are analyzed by a guided procedure that follows these steps.

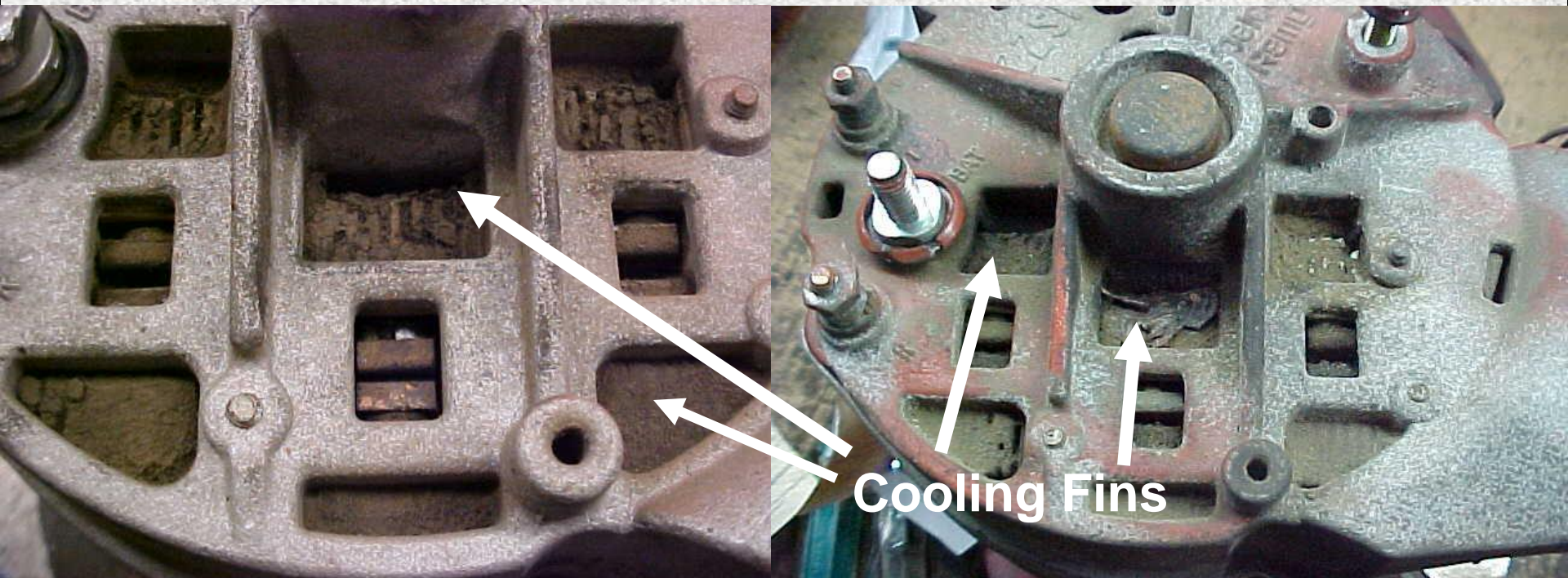
- 1) Resistance measurements are made to verify all electrical connections and integrity of components.
- 2) If all connection resistances meet the specification, a performance test is performed on the alternator.
- 3) The alternator is tested for turn on, high and low speed performance levels. The voltage regulation is also tested during the performance test.
- 4) If alternator meets the requirements of the "cold" test parameters, the alternator is run for 3 minutes at maximum output condition. The alternator performance is then retested and checked to the original parameters.
- 5) If the alternator meets all specifications the unit is disassembled to inspect for any unusual wear and intermittent conditions.
- 6) A copy of the tester results is then supplied to the customer when the unit is returned. A copy is then filed for future reference.

Examples of Non-Warrantable Products

Alternators

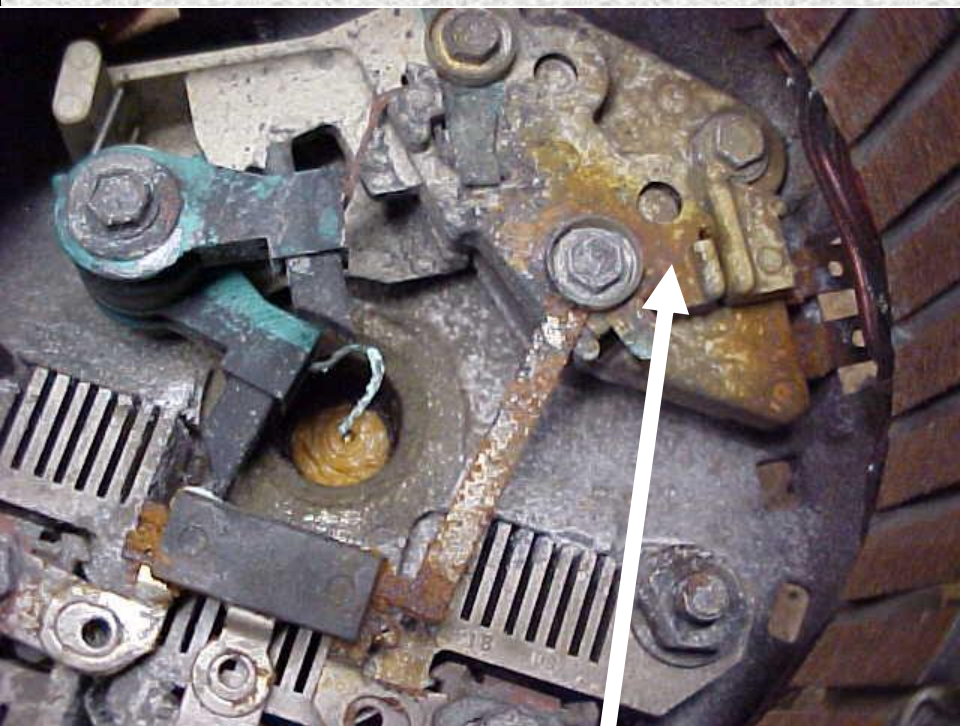


Non-Warrantable

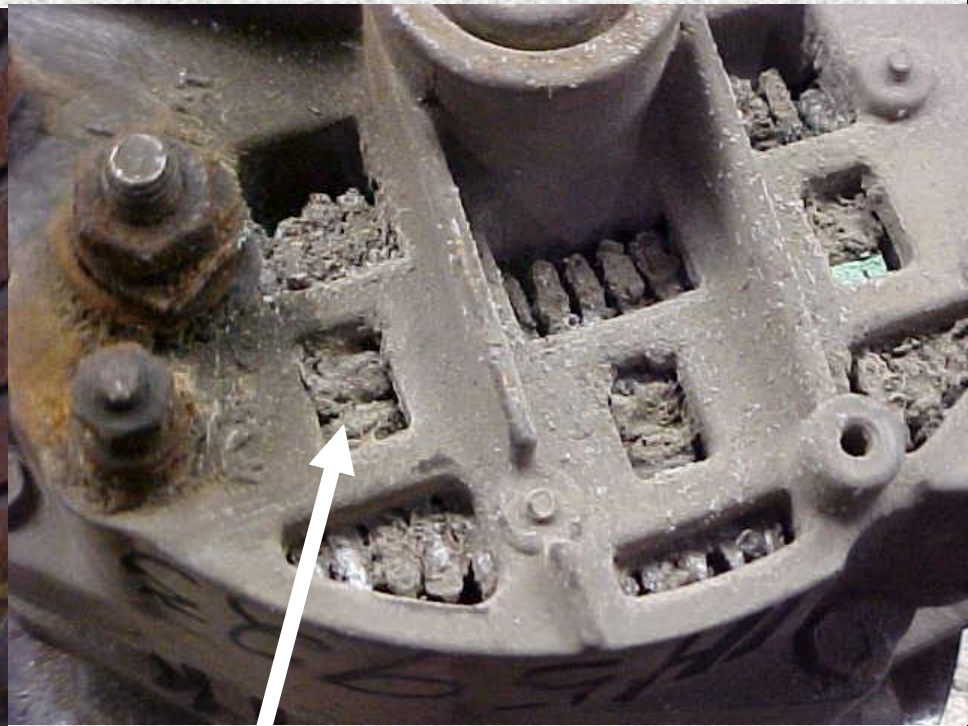


**Rectifier Assembly : Cooling Fins
Contaminated/Clogged with Debris**

Non-Warrantable



Alternator exposed to excessive water entry into unit.



Debris collected on cooling fins Without use of debris shield.

Excessive Contamination BorgWarner Inc.

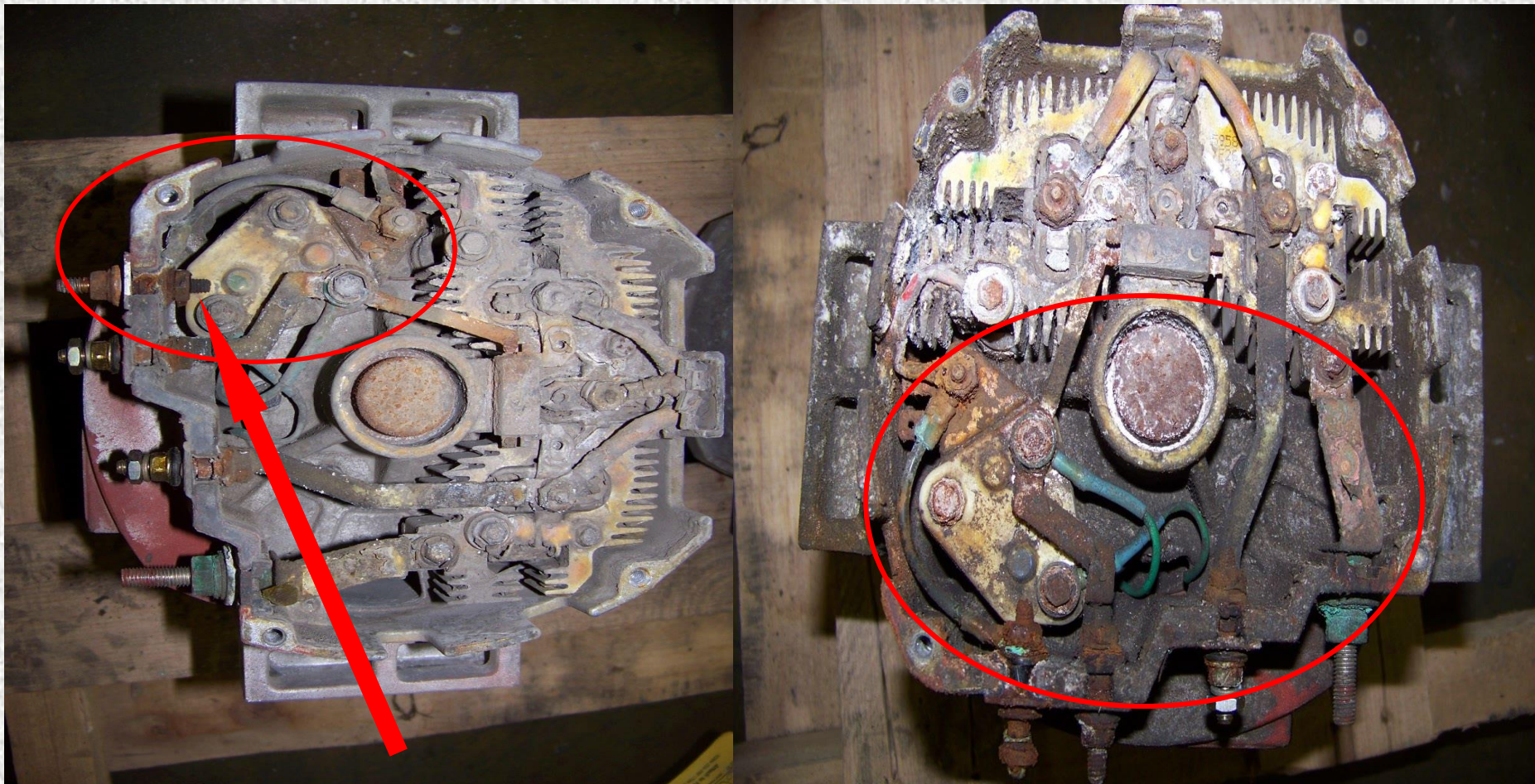
Revised: February 2017,

Black Plate Removal



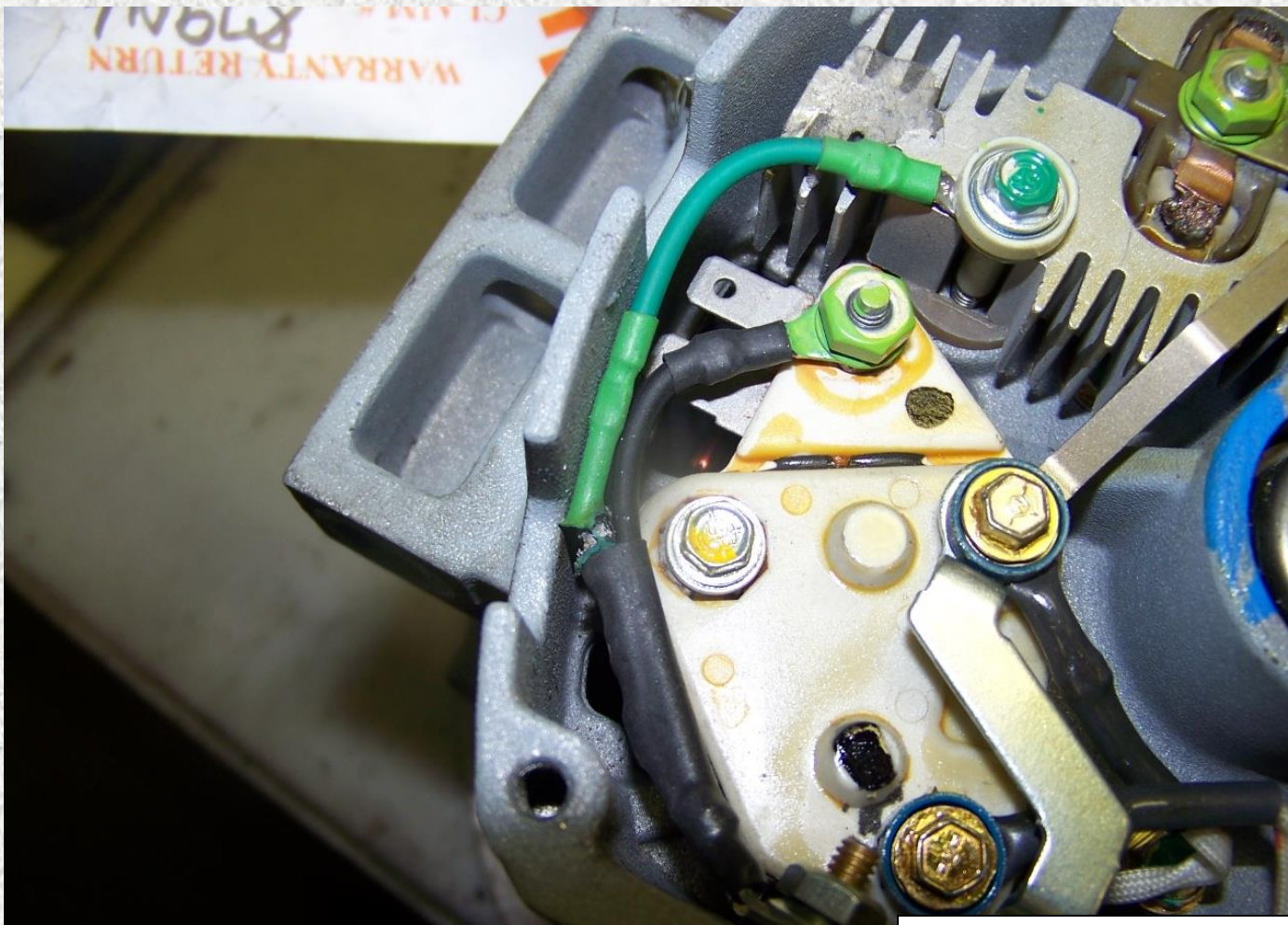
On the 33/34/35/36SI only, the four (4) Back Plate Screws and Back Plate may be removed to perform a visual inspection of components only (such as excessive corrosion). Re-install the Back Plate and Screws after inspection. If the Back Plate is removed for inspection it must be noted in the claim comments or claim may be denied due to customer disassembled/modified unit.

Non-Warrantable

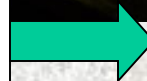


Alternator exposed to water spray creating excessive
Corrosion / Salt Bridging

Non-Warrantable



“S” Terminal Resistor Blown/Burnt
due to an external ground condition

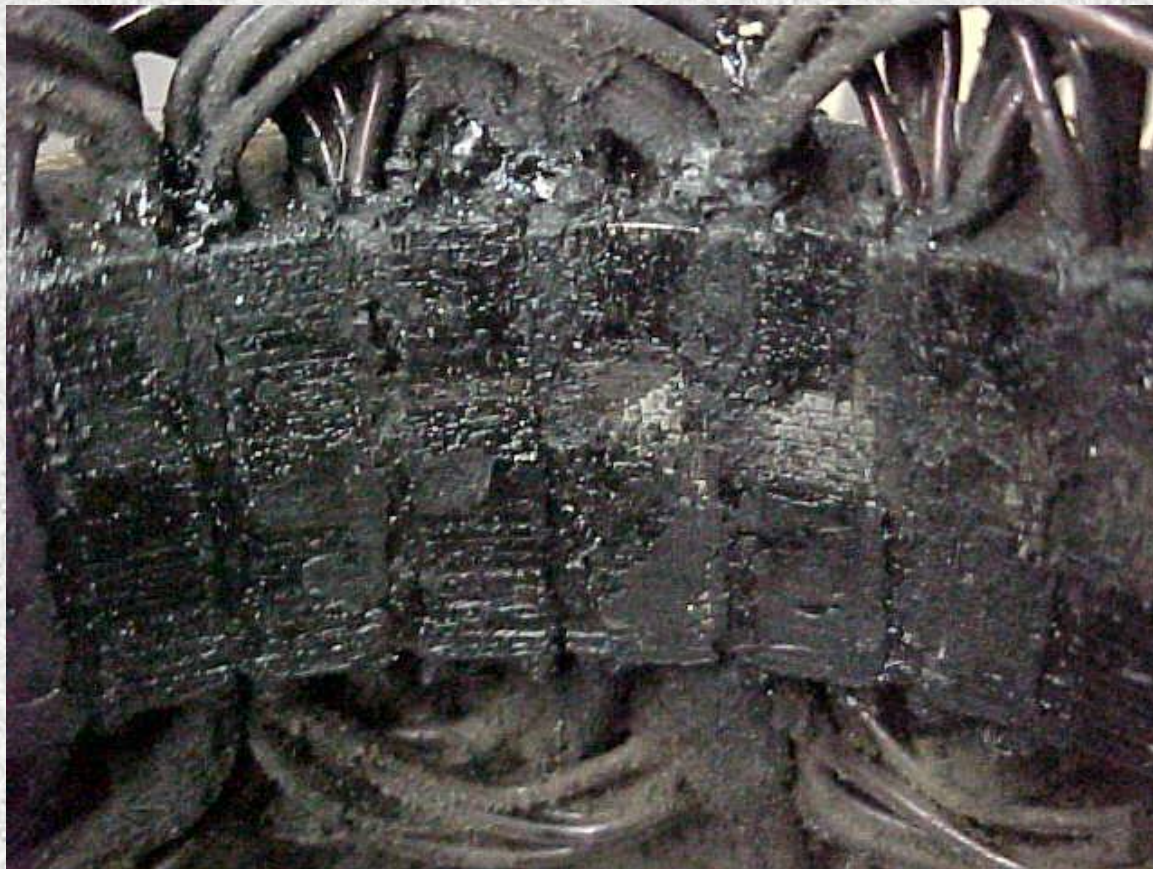


See potential causes
on next page

Non-Warrantable

- Potential causes & prevention of “S” Terminal Resistor Blown/Burnt due to External ground condition of the S-terminal:
 - Corrosion on the S-terminal ring terminal / lead (wiring harness) creates a ground path (to alternator or chassis) → alternator failure may be preceded by complaints of high voltage
 - Damage to wiring harness creates a ground path
 - Mis-wiring the Remote Sense lead to ground
- Disconnecting the B+ (charging) cable while the alternator is spinning

Non-Warrantable



**Stator: Excessive Contamination
Engine Oil Intrusion**

Non-Warrantable

Non – Delco Remy Manufactured or Remanufactured



Non-Delco Remy

Delco Remy with OE Bolts

Side by side comparison of through bolts

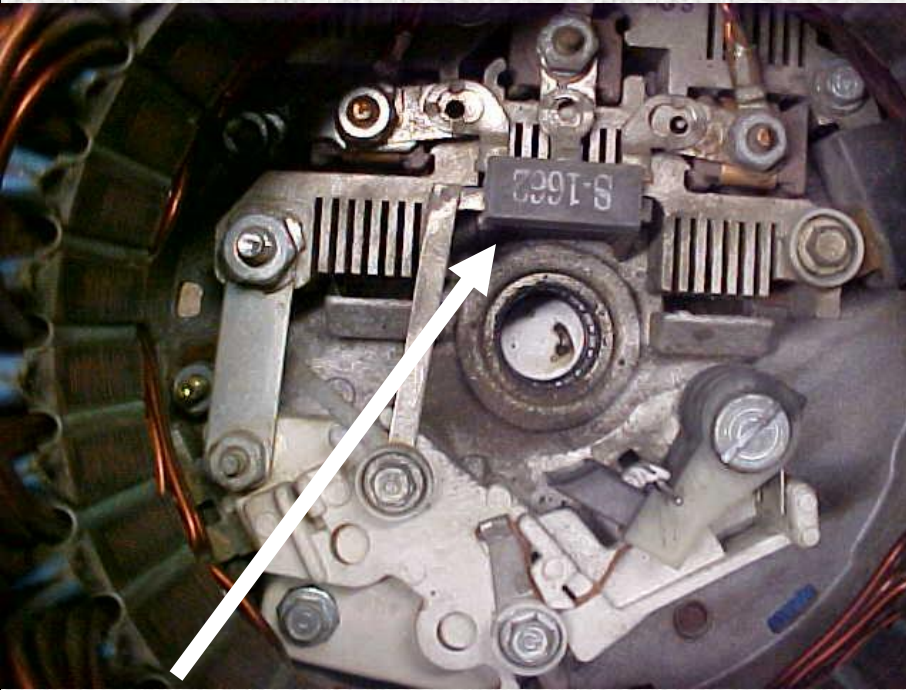
Non-Warrantable



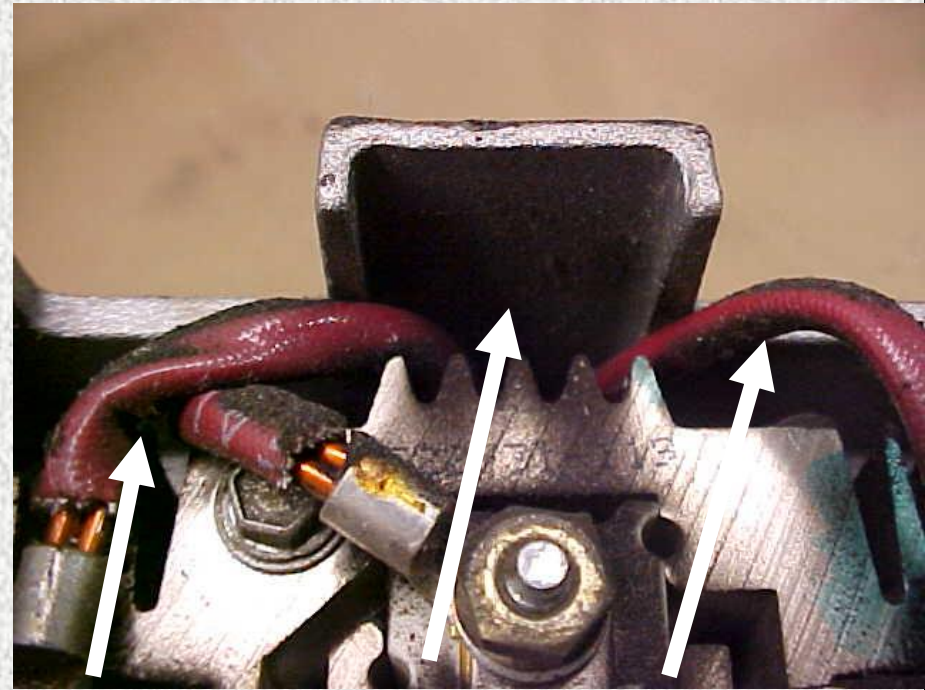
Non – Delco Remy Manufactured or Remanufactured

Non-Warrantable

Non – Delco Remy Manufactured or Remanufactured



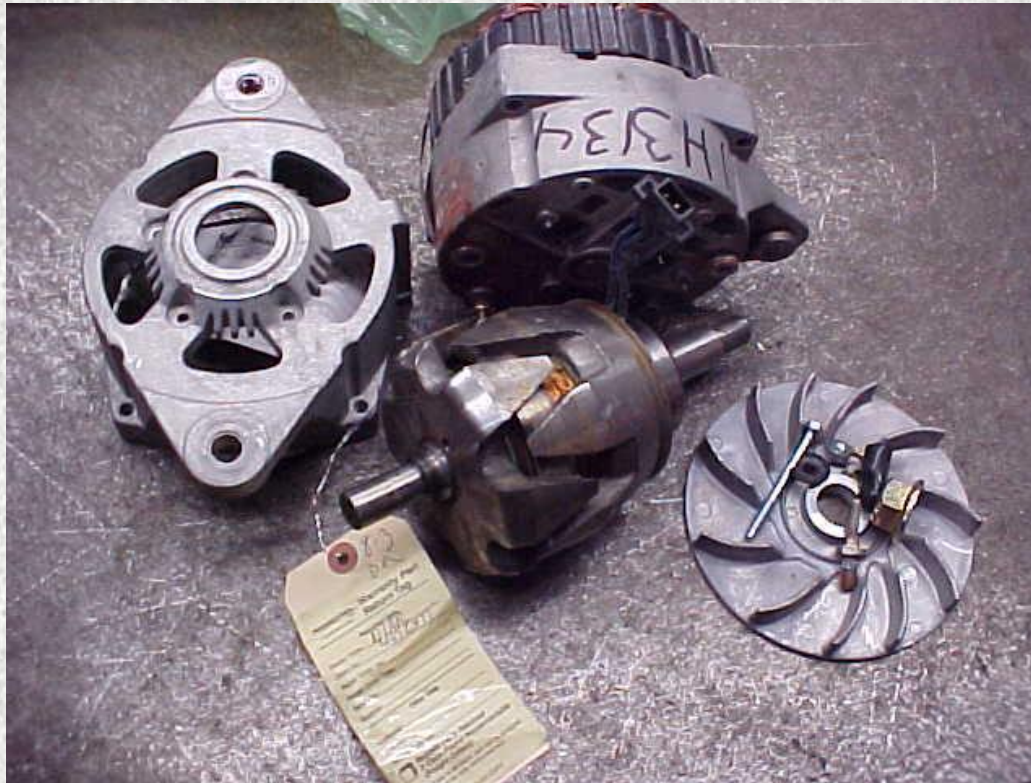
Non-Delco Diode Trio



Non-Delco Stator Lead without grommet.

Non-Genuine Delco Remy OE parts

Non-Warrantable



Customer Disassembled / Modified Unit

Non-Warrantable



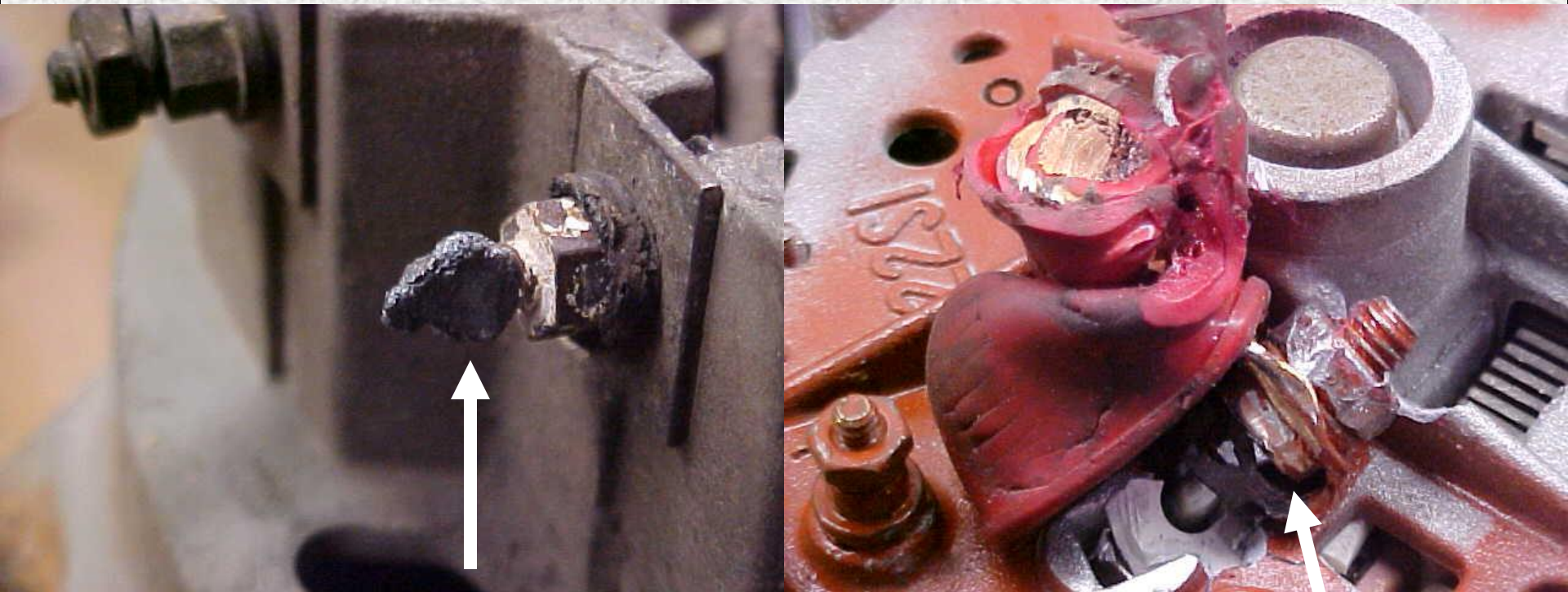
Drive End Casting : Mounting lug fractured due to improper installation and preventative maintenance

Non-Warrantable



Customer Mounting Bolt Loose

Non-Warrantable



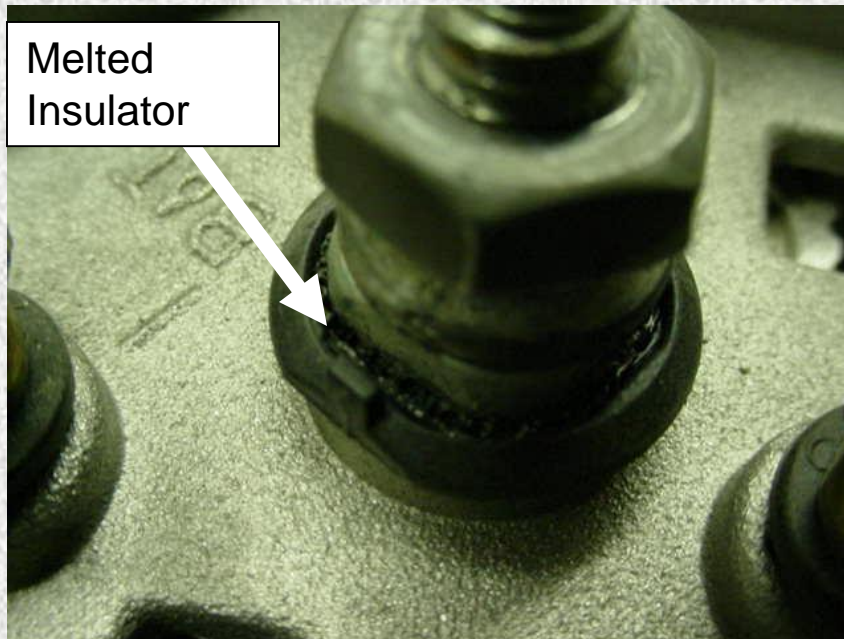
**Terminal damaged due to
Harness wiring arcing**

**Output Terminal fractured; unable
to test unit for performance.**

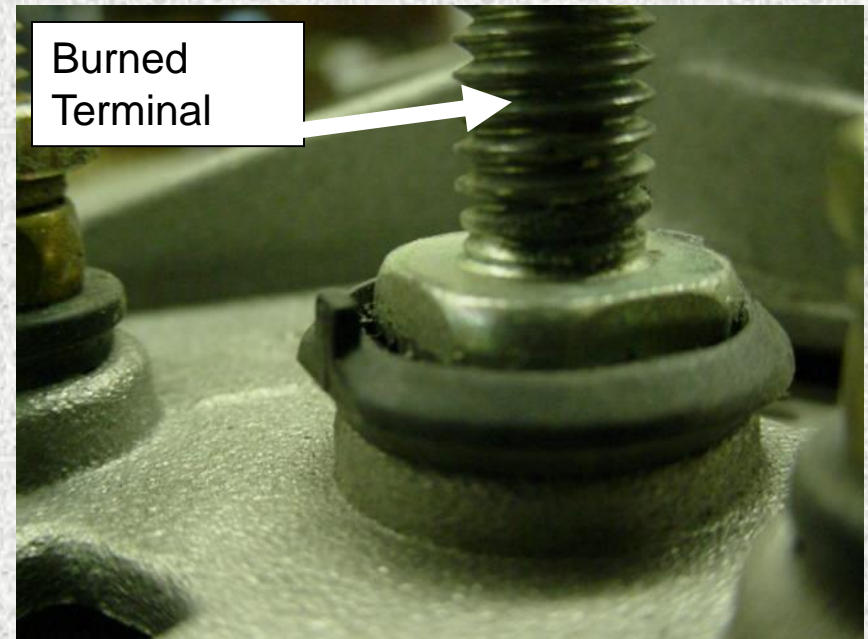
Customer Damage to Unit

Customer Damage to Unit

Non-Warrantable

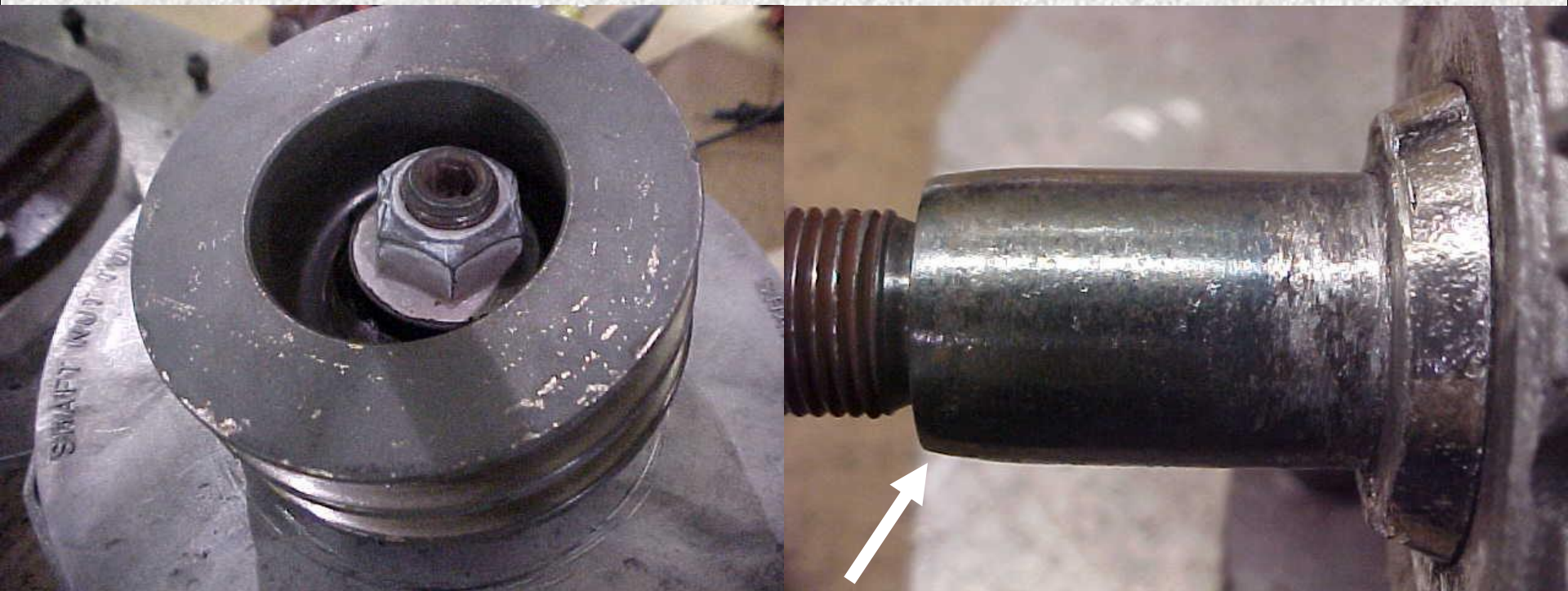


Terminal damaged due to
Harness wiring arcing (**Poor
connection from Vehicle to
Alternator Output Terminal**)



Output Terminal fractured; unable
to test unit for performance.

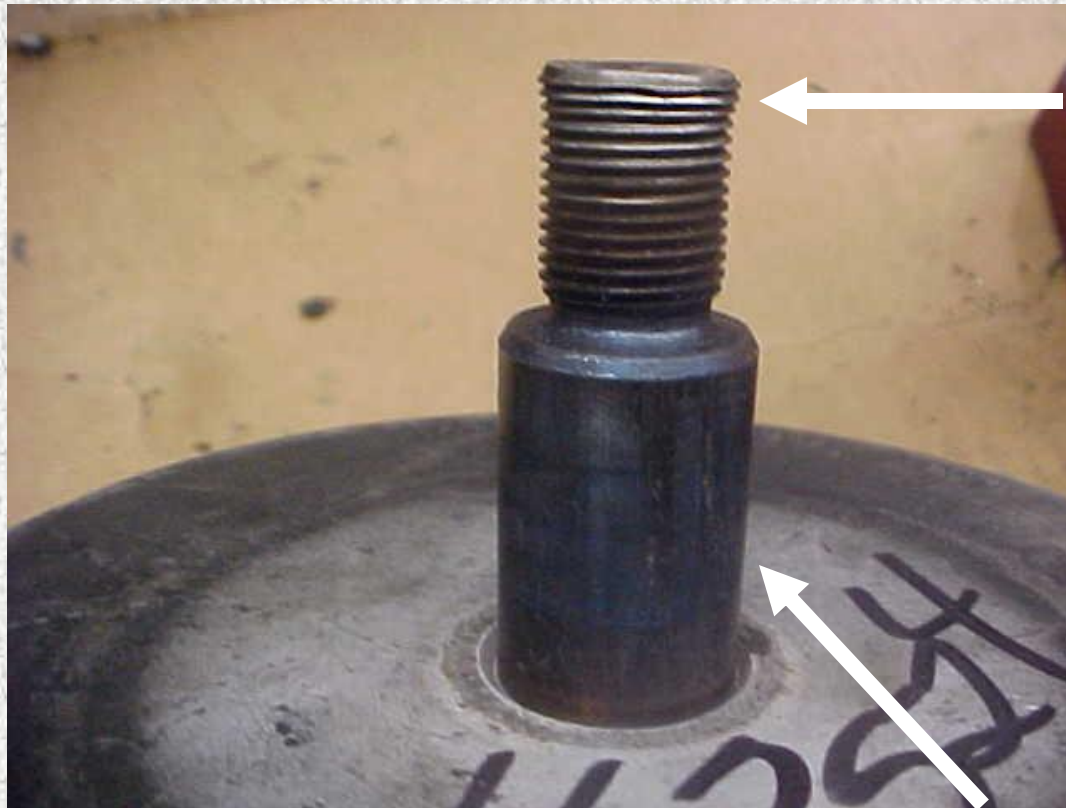
Non-Warrantable



Excessive wear on rotor shaft

Pulley : Loose Pulley Nut

Non-Warrantable



**Damaged
Pulley Nut
Threads**

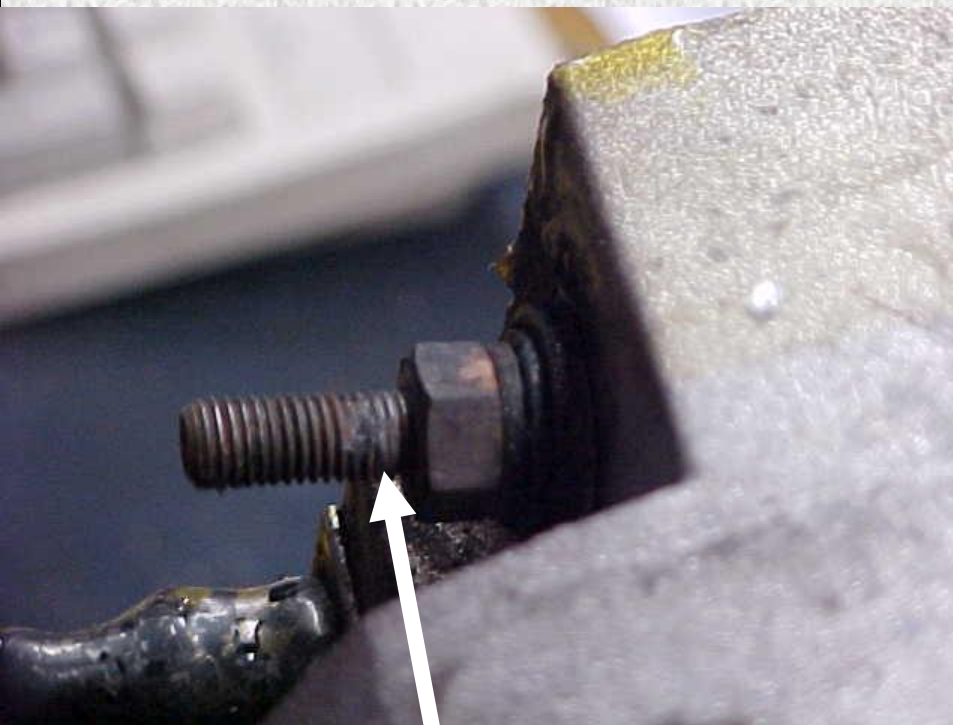
Customer Pulley Belt Loose (Blued)

Non-Warrantable



**Rotor Assembly : Damaged/Stripped Pulley
Nut Threads**

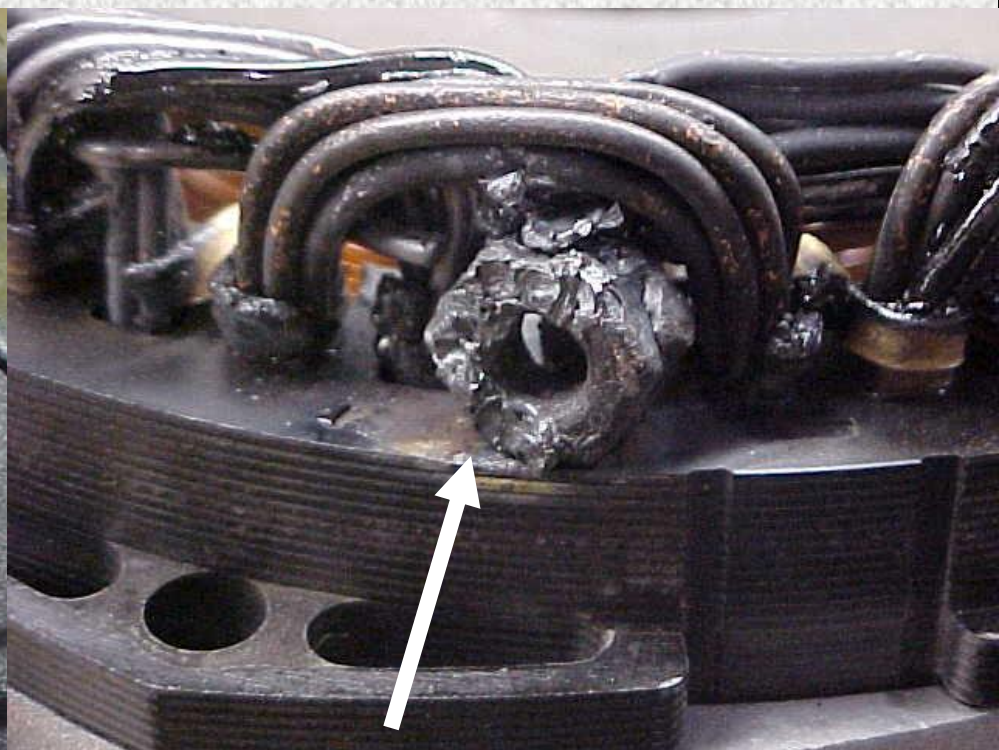
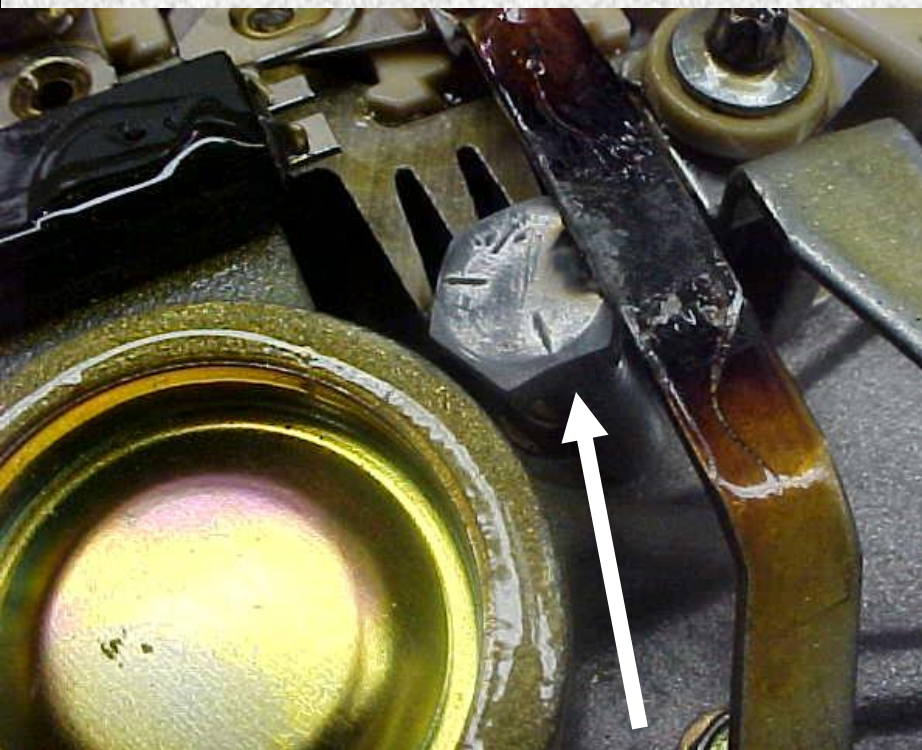
Non-Warrantable



Heavy Arcing present from loose cable terminal

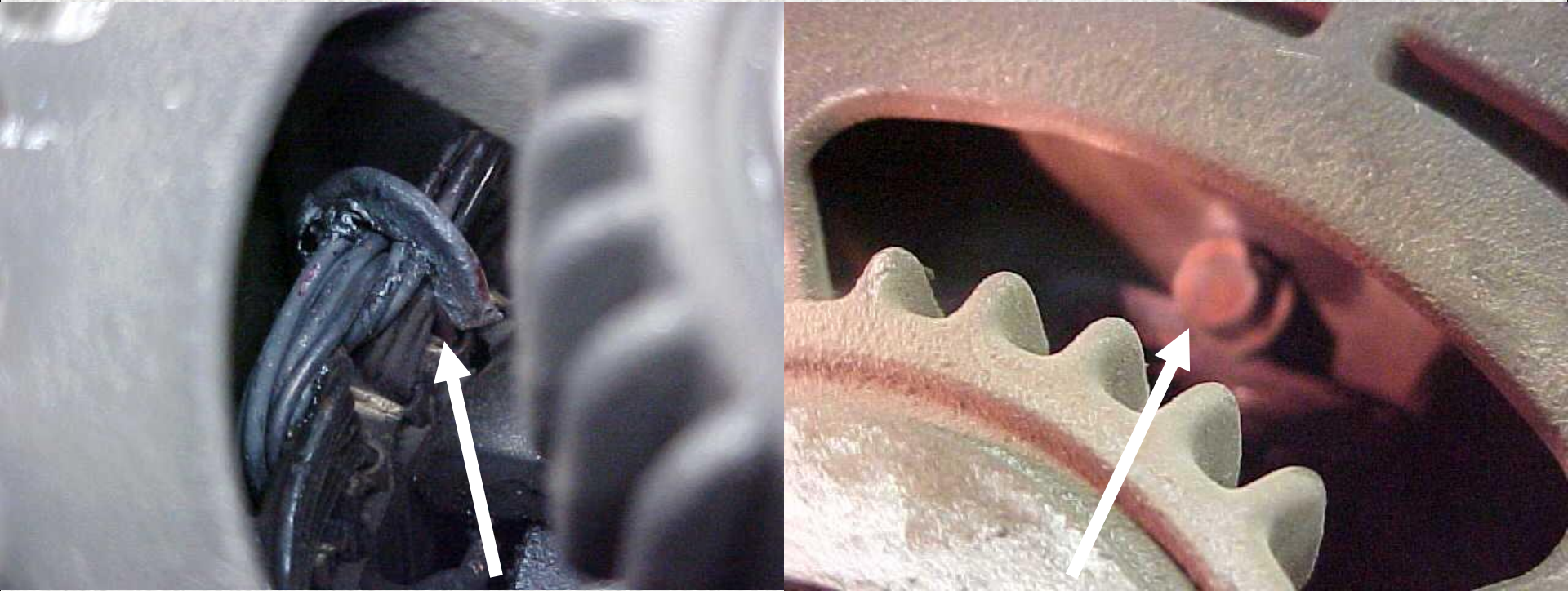
Output Terminal : Loose Terminal Connection

Non-Warrantable



Extra Part in Unit (Non Delco Remy)

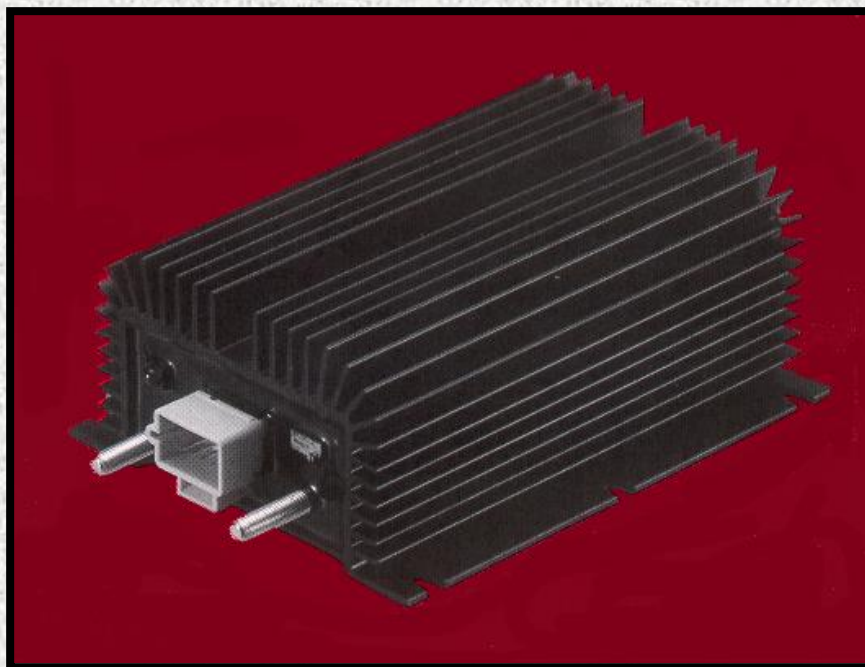
Non-Warrantable



Extra Part in Unit (Non Delco Remy)

Examples of Non-Warrantable Products

Low Voltage Disconnect (L.V.D.)



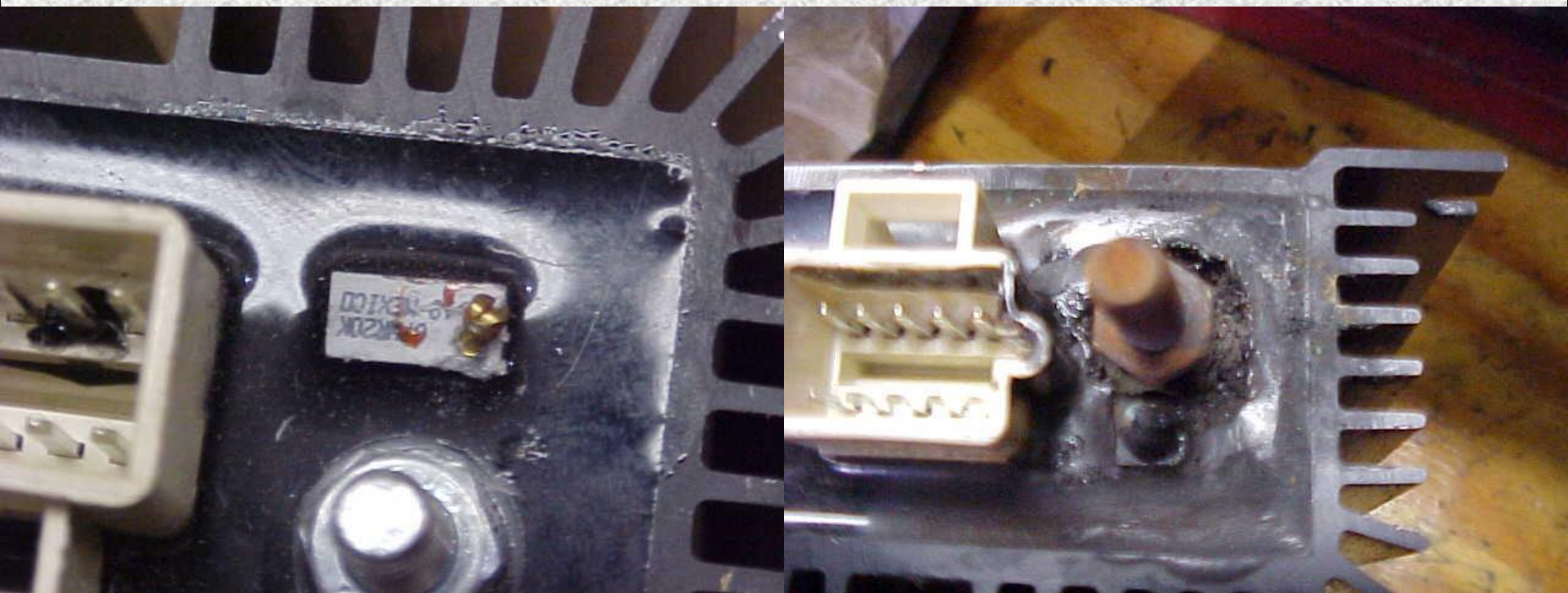
Factory Set Voltage Minimums

Non-Warrantable



Customer Adjusted Voltage Pot (L.V.D.)

Non-Warrantable



Customer/OE : Customer Damage to Unit



Warranty Checklist

Please review this check list prior to attempting to submit warranty claims on Delco Remy units.

Does the product fall within the date and mileage limitations?

Does the product show signs of customer damage?

Does the product show signs of miss-application?

Is the product fully assembled?

For help determining if a Delco Remy product is warrantable, please contact BorgWarner Technical Service at 800-372-0222 or BorgWarner Delco Remy Product Warranty at 888-600-5777