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SERVICE BULLETIN

Drive Motor Armature Damage

Model #: All Date: 6/19/2008

AFFECTED TRUCKS: DC control systems only.
This is an information bulletin only. No action is required.

There are three basic failure modes for the motor armature.

1. Shorted windings or commutator.
2. Raised commutator segments.
3. Expanded armature windings or exploded commutator.

Shorted windings is normally a result of excessive heat melting the enamel insulation around one or more of the armature coil wires. The symptoms of a shorted armature are:

- Slow, lack of power.
- Excessive motor current.
- Jerking or shuddering at low RPM.
- Burnt commutator segments 180º or 90º apart.

To test for a shorted armature, the armature must be removed and placed on a growler[1]. If the armature is shorted, it must be rewound or replaced. NOTE: If the armature was shorted due to excessive heat, then it is likely that the field coil is also damaged.
A shorted commutator will result in the same symptoms as a shorted armature. A shorted commutator is normally due to debris stuck between one or more commutator segments.

Raised commutator segments are normally a result of stalling the motor but can also occur at excessive motor RPM. The symptom of a raised commutator segments is a “ticking” sound that varies in frequency with the motor RPM. On motors with exposed brushes, it can be confirmed by applying very light pressure to the top of a brush with your finger and slowly rotating the motor. You will feel the brush moving up and down as it passes over the raised segment.
In many cases, the raised segment can be repaired by turning the commutator on a lathe.

Expanded armature windings and/or an **exploded commutator** is a result of excessive motor RPM. Typically, motor maximum RPM is approximate 2-times the motor rated running RPM. For example: If a motor is rated to run at 4,000 RPM at 36 volts, it can withstand 8,000 RPM before damage will occur. In a vehicle, this can only be a result of traveling down a hill at an excessive rate of speed. For example: If a vehicle is rated at 12 mph, then the vehicle would have to exceed 24 mph to expand the armature.

1. Refer to http://en.wikipedia.org/wiki/Growler_(electrical_device)

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