

■ **Alternator Diode Insertion: Identification of Potential Diode Seating and Overheating Problems**

Highlights:

- Detects missing and incorrectly sized diodes
- Detects potential for loose diodes
- Ensures proper diode seating for optimum heat transference
- Immediate PASS/FAIL feedback
- Provides trend analysis for continuous product improvement

The life of an alternator diode, and by extension, the reliability of the entire automobile electrical system depends to a large degree on how well heat is conducted away from the diode junction.

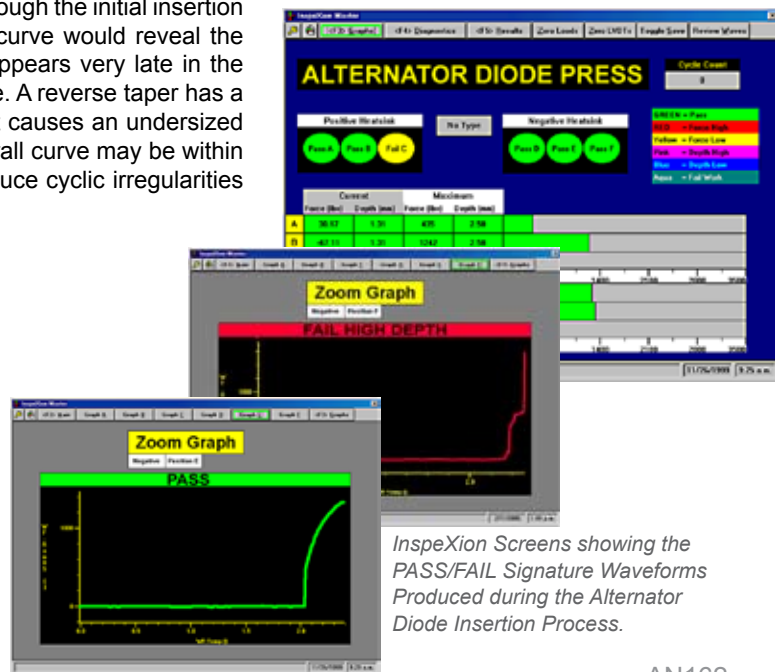
When the diode and heat sink hole are properly sized and are parallel to each other, the diode is held securely and the maximum metal to metal surface is available to conduct heat from the diode into the surrounding casting. If the diode or hole is incorrectly sized, or the surfaces are bowed or tapered, contact is made over only a limited area and the diode could overheat. Vibration can also cause the diode to work loose if it is improperly seated and the overheating problem will be increased.



Traditional monitoring methods that record the peak press force cannot reveal these subtle defects, but the Sciometric Test and Analysis System with InspeXion® software solves the problem by monitoring the press head force over the diode insertion distance. A normal curve determined from known good samples has three major features: the initial “knee” when the diode is engaged, a steady increase in force as the diode is inserted, and a sharp increase when the press bottoms out.

If the hole is bowed the knee is late in the curve, and although the initial insertion force could be within the tolerances, the slope of the curve would reveal the small area of contact. The “knee” for a tapered hole appears very late in the curve and reveals the potential for the part to work loose. A reverse taper has a normal knee but an incorrect slope. Initial misalignment causes an undersized diode to “chatter” as it is pressed into position. The overall curve may be within the target envelope, but the variations in pressure produce cyclic irregularities in the curve.

The powerful InspeXion software provides the operator with instant PASS/FAIL information and can maintain records for future trend analysis. Signature Analysis enables continuous product improvement, ultimately reducing warranty costs and enhancing the manufacturer’s reputation for quality.



InspeXion Screens showing the PASS/FAIL Signature Waveforms Produced during the Alternator Diode Insertion Process.

