

■ **Automobile Water Pump: Verification of 3D Geometry, Distance, and Machining of Castings**

Overview:

The manufacturer identified 14 specific distances on the casting relative to a datum that would define the proper geometry, and used them to compute a number of theoretical planes that must hold definite geometrical relationships in order to declare a good part. Co-planarity of the various mounting surfaces is critical, particularly of the pump feet to the hub and the cover surface to the impeller. The system builder developing the test tooling tried to use a conventional system supplied by a competitor for many months, but could not achieve satisfactory results.

Highlights:

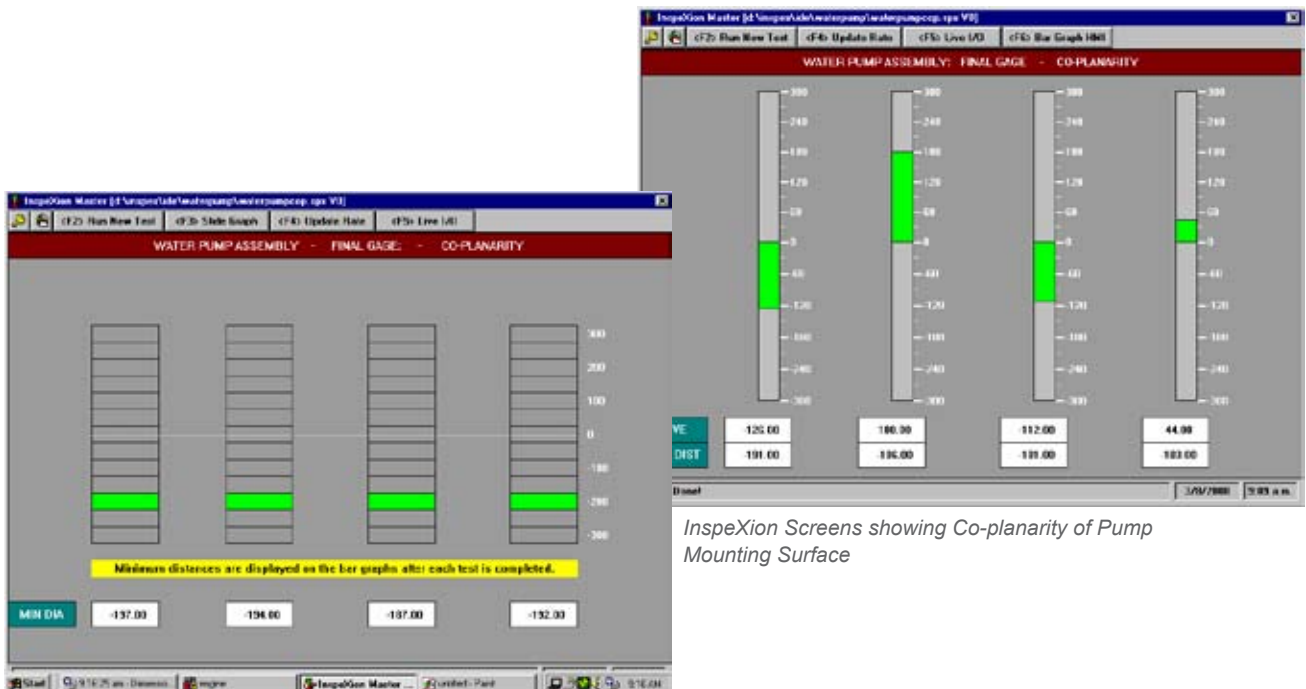
- Measures 14 critical distances
- Computes co-planarity of mounting surface
- Direct display of co-planarity
- Immediate PASS/FAIL indication
- Easily adaptable to other part types
- Full data logging and trend analysis available

A precise fit in three dimensions is crucial to the reliability of this V8 engine water pump. Ease of assembly, minimal stress on the casting and long-term reliability depend on the accuracy of the machined surfaces and the position of mounting holes.



The Sciemetric solution used 14 distance transducers to gage the critical distances and used sets of three points to define each plane. The signature software presented the results of the calculations on a screen, together with a PASS/FAIL indication. The entire test system and software was set up and commissioned in approximately two weeks, including on-site commissioning and gage repeatability and reproducibility.

This application clearly shows how the powerful computational capabilities and the flexibility of Sciemetric's Signature Analysis software can provide a simple solution to a seemingly difficult quality assurance problem.



Inspexion Screens showing Co-planarity of Pump Mounting Surface