Custom Design Solutions

18,000 RPM Air Bearing Spindles for Image Scanning in Harsh Conditions

“Our mission is to apply our specialized skills, experience and technical capabilities to any application requiring the highest precision motion.”
ABTech Custom Design Solutions

“Design Built for Custom Applications”
18,000 RPM Air Bearing Spindles for Image Scanning in Harsh Conditions

The Challenge

Design an inspection system for a European high-speed rail system – that must function accurately in harsh conditions while moving 75 mph.

The Design Solution
We designed a set of three high-speed air bearing spindles that were synchronized for the 3-dimensional image scanning and inline inspection. To inspect the track, switches, tunnels and bridges for potential maintenance issues, the system was mounted on a dedicated rail car traveling at 75 mph allowing the spindles to create a 3-D image of the rail every 10 cm (less than 4”).
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To achieve the necessary rotational speeds of 18,000 rpm, the design incorporated individual direct drive brushless DC servo motors and encoders on each of the ultra-precision air bearing spindles. To simulate the most extreme conditions, each spindle was tested, including vibration testing to 10 G’s, after being stored in a freezer overnight and then run at 180°F continuously for over 8 hours.

**System Feature Summary**
Synchronized ultra-precision air bearing spindles
- Aluminum construction for low inertia
- Individual direct drive brushless DC servo motors
- High resolution rotary encoders
- 50 mm clear apertures through the spindles
- 45° fold mirrors
Vibration isolation platform
Multi-axis controller
Capacitance probe monitoring system
ABTech Ultra-Precision Metrology, Motion, and Custom Engineered Solutions. We have one for you....

ABTech’s full in-house engineering, manufacturing, assembly and testing capabilities are the answer for just what you need.

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