



Circumferential Probe Traverse System

Description

Designed and manufactured for the testing of turbine blading at two planes in the last stage of an industrial turbine test rig, the system was based around a central, rotating hub that was able to accommodate two different probe traverse systems, each in one of two locations. The first traverse system comprised 3 axes (radial, yaw and pitch) and the second comprised 2 axes



3 Axis Traverse



2 Axis Traverse

(radial and yaw). Based upon existing 2 axis probe traverse system designs, these units were adapted to suit the specific application. The circumferential traverse system itself was based around a large diameter wire race bearing configuration of 1000 mm dia, supporting the main internal circumferential traverse hub on which were mounted the 2 and 3 axis traverse actuators. The circumferential traverse was driven using a large stepper motor via a high accuracy, low backlash Davall gearbox with incremental encoder feedback. Each of the two traverse actuators was connected to their respective drive system by a single multi core cable, via a circumferential cable tray system and 10 m extension cables. The cables were screened to minimise EMC effects and MIL spec bayonet connectors used to allow 60°C continuous operation. The control systems for each of the traverses were then supplied in individual 19" rack-mounted housings. PC based LabVIEW was used for data acquisition and control.

Specification Summary

- Main housing/mounting for 1 m dia bearing
- Outer rotary seal to static housing
- Main circumferential rotating hub for traverse support
- Traverse range = +/- 180 deg
- Traverse accuracy = +/- 0.1 deg
- Traverse resolution = +/- 0.005 deg
- Traverse speed = 5 deg/s



Circumferential Traverse System Mounting Hub and Support Framework

Disciplines Used

- Electro-mechanical design, fluid dynamics analysis, stress & vibration analysis, electrical and electronics design, software & control, manufacture, assembly, test & commissioning.