

## **LG Motion – Drives and Control Specialist presents customised positioning system for a leading UK research institute.**

Basingstoke based LG Motion Ltd designs and manufactures a wide range of motion-control technology components and systems to meet the requirements of research and academic institutions and the wider industry.

### **Solutions and products**

In simple terms, LG Motion designs and develops systems that make things go in and out, up and down and round and round! Describing the product range is difficult as more often than not the solution required is an amalgam of motion control components.

To complement LG Motions own product range the company has long-standing partnerships with key global partners such as Arcus Technology, Airex, Precision Motion Dynamics, Velmex, Heidenhain, Schneeberger, SMAC and Empire Magnetics.

### **Detector Positioning System**

Diamond Light Source, the UK's national synchrotron science facility approached LG Motion to design and manufacture a customised "Beamline Detector Positioning System".

The system illuminates miniscule crystal samples with an X-ray beam and the detectors are positioned to a precision of just a few tens of microns to capture scattered light that reveals the complexities of protein structure and their functions.

### **The challenge for LG Motion**

The objective for the scientists was to increase flexibility and research throughput on the I24 beamline. The design specification called for an XZ positioning rig with the ability to load multiple detectors up to 280kg mass with a volume of around 1 m<sup>3</sup> over a 1.55 metre horizontal and 0.85 metre vertical travel range.

### **The Solution**

The custom-built detector positioning system is based around precision linear rails with integrated linear encoder and precision ground ballscrews that are connected to a servo motor via flexible couplings. The vertical axis includes a safety brake and further in-line planetary gearhead reduction to ensure that it does not back-drive under power off conditions, even if the fail safe brake is disengaged for any reason. Both axes also include datum and over-travel limit switches as a part of the specification.

The 280kg detector load is evenly distributed on the horizontal stage carriage plate using a welded steel framework with four vertical precision linear bearing rails which guide the vertical translation of the detector mounting platform.

Each horizontal rail has three bearing carriages that support the upper moving horizontal stage carriage plate which is approximately 1000mm square and 20mm in thickness. The large base plate of the detector system was bolted to the experiment hutch floor after some precision laser alignment, levelling and grouting on installation.

The vertical axis uses one pair of bearing rails utilising three bearing carriages, with the opposing pair just one carriage, this design is much preferred to a more conventional dual bearing arrangement for overhung loads, but this design allowed the use of smaller linear bearings and simplified the power transmission mechanics to be used.

### **The Components**

**The Schneeberger MONORAIL AMS** series linear motion guide bearings with linear encoders was selected for its compact, integrated design that offered exceptional loading characteristics, smooth motion and precision feedback. The Schneeberger solution was selected as it is used extensively on large-scale precision machine applications with advantages of 'close to load' measurement and simplified installation plus cost benefits over separately supplied bearings and encoders.

The beamline detector mounting platform is fabricated from **MiniTec modular aluminium profile system** which was ideal for design flexibility and fixing mounting brackets to.

### **LG Motion – the partner for you**

The solution from LG Motion Ltd met all relevant machinery directives, safety standards and performance specifications originally required for the project.

If you have a particularly challenging drives and controls project to resolve the engineers at LG Motion - with over 100 years cumulative experience in providing the right motion control solution - will be very happy to hear from you.

For more information on how LG Motion can help you please contact us:

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