
Gaging Transducer use in a Synthetic Diamond Press

The Series 350 DC-DC Gaging Transducers offer a convenient solution to position sensing with all supporting electronics located internally and packaged together with a durable spring-loaded spindle. Complete electronics provide DC-in/DC-out operation while the spring actuation feature allows for minimal contact to the tip of the transducer. Similar to a customary LVDT with a free-floating core assembly, the movement of the spindle within the coil produces a voltage change in the output directly proportional to the displacement.

One well known hydraulics company, a diversified manufacturing and engineering firm, has incorporated the Model 0355-0000 Gaging Transducer for position feedback in the design of their 5,000 Ton Synthetic Diamond Press. This specialty item is used for the production of synthetic diamonds. The primary market for these diamonds is saw blades for cutting concrete, marble and granite in the road construction industry. Used worldwide for making quality diamond grit, these impressive machines are an important tool for developing roadways in many third world countries.

The process of making synthetic diamonds involves applying both temperature and pressure simultaneously to graphite for a specified length of time. During the pressing cycle, both nucleation and growth of the diamond crystal are essential and are ensured by maintaining the proper temperature and pressure.

Discrepancies in the composition of the diamonds occur from

the significant difference in density between diamond and graphite. Consequently, a key parameter in this synthesis process is controlling the downward motion of a punch to maintain a constant pressure. The gaging transducer is a critical component in this portion of the system.

Bridged between the cylinder and ram assembly, the Model 0355-0000 provides continuous position feedback of the ram as it extends over a 4.0 inch working range. The output signal of the transducer is displayed on a digital meter in millimeters and is also plotted in a graphical format for viewing by a machine operator. Also routed through a processor, this precision absolute value is used to determine the rate of compression and maintain a consistent pressure on the graphite while the synthetic diamonds are fabricated. Adjustments are made both by the machine operator and by an automated controller.

For this application, the customer discovered during design and development stages that few devices were able to monitor the press over the required fine increments of displacement. As a result, this gaging transducer was chosen over other competitive technologies because of its accurate measurement capabilities.

This company was able to take advantage of several beneficial features of the Series 350 including full conditioning electronics and a spring assembly integrated in a compact, rugged package. These unequaled qualities are the main elements in a sensor that is both highly accurate and easy to use.