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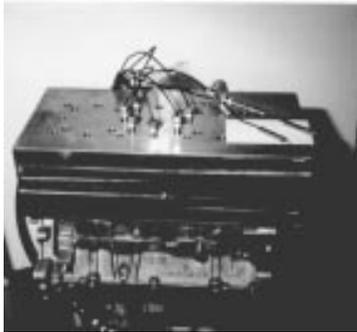
# Gaging Transducers Improve Cylinder Head Testing

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A gaging transducer, made from an LVDT with a captive, spring-loaded core assembly, offers a versatile means of position feedback. It provides accurate linear measurement and eliminates the need for a hard connection to the core extension rod. This type of transducer is particularly suited for material thickness measurement, machine control, automated testing and numerous other applications.

The newest design of gaging transducer from Trans-Tek is the Series 330 3/8" AC-AC Gaging LVDT. This product line features advanced coil winding techniques employed to minimize overall length and carefully selected spring forces to ensure proper balance of mechanical frequency response and tip force. Perhaps the best advantage is found with its 3/8" outer diameter, allowing for usage in areas with limited space.

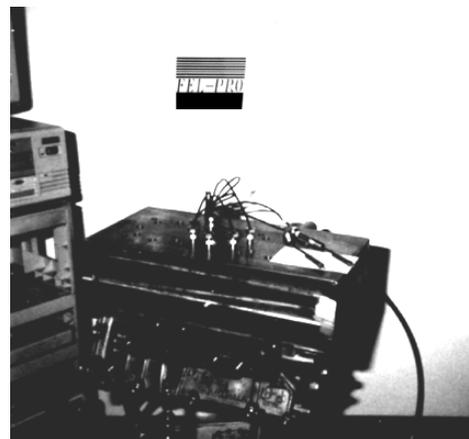
A well-known manufacturer of cylinder gaskets for the automotive industry applies this family of transducers to the testing of cylinder head movement during an engine's simulated combustion stroke. Developed by an instrumentation engineer working in the product test lab, this set-up allows technicians to carefully monitor the amount of lift experienced at different points of pressure. The gathered information leads to improved design and performance of the company's sealing gaskets.



An internal combustion engine cylinder head is bolted to a 4 to 5 inch thick steel plate. Eight equally spaced Model 0331-0000 3/8" AC-AC Gaging Transducers, each with a working range of  $\pm 0.010$ ", are mounted on the opposite side of the plate in a circular pattern near the outside edge of the plate. The LVDT probe tips contact the cylinder head just outside the combustion seal area. An O-ring is used to seal the head to the surface of the plate.

Nitrogen gas is introduced into the combustion chamber through the spark plug opening, simulating pressures at the seal area as high as 2500 psi. As pressure test limits are approached, the cylinder head lifts away from the steel plate. The amount of movement, ranging from 5 to 25 micrometers, is detected by the eight LVDT's. The signal output from the transducers is monitored and recorded by a computerized data acquisition system. A graph of the movement versus the applied pressure is also generated.

The Trans-Tek gaging transducers were installed as a replacement for two dial indicators, the previous method of testing. As a result, set-up time is reduced from two **days** to two **hours**, while accuracy is improved to  $\pm 0.2$  micrometer from  $\pm 1$  micrometer. The readings are also found to be much more consistent. In fact, repeatability is a key benefit of an LVDT and is specified as 20 microinches for the Series 330.



Gaging transducers are an excellent alternative to dial indicators and other similar devices, providing superior accuracy and repeatability. As seen in the example above, upgrading to a gaging LVDT will result in overall better performance as well as time and money savings.