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## Compact AC LVDT Fits Design of Friction Welder

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Increasingly, there is the need to make things more compact. This is certainly the case in the design world, where making smaller products requires smaller components. In the field of linear position control, Trans-Tek addresses this issue with the Series 230 AC-AC LVDT. To achieve its miniature size, a special winding process is used resulting in an excellent length to stroke ratio for each model, while always maintaining a 3/8" outer diameter. Working ranges include:  $\pm 0.005$ ",  $\pm 0.010$ ",  $\pm 0.025$ ",  $\pm 0.050$ ",  $\pm 0.100$ ",  $\pm 0.250$ ",  $\pm 0.500$ " and  $\pm 1.000$ ".

With the main emphasis on size, the Series 230 transducer also offers precision linear feedback in a rugged, industrial package. Specifications include maximum non-linearity of  $\pm 0.25\%$  FS, extremely low temperature coefficient and superb repeatability. The low-mass core introduces almost negligible mechanical resistance when used in systems with low driving forces or high accelerations. This entire group is electrically supported by the Model 1000-0014 Oscillator/Demodulator for DC-in/DC-out operation.

A leading developer and seller of friction stud welding machines, featuring portability and size as key advantages over their competitors. The work performed by these devices - friction welding - is one of the most established and trusted joining processes in the industry. It involves joining together two materials using heat generated between a rotating part and a fixed substrate material under an axial load. Critical components - such as automobile driveshafts and steering parts - are manufactured using this safe and reliable method. These friction welders are ideal for joining similar metals, high-strength high-carbon metals, dissimilar metals, exotic materials and non-exotic materials.

Unlike conventional welding, friction welding is a process in which heat is generated by direct conversion of mechanical energy to thermal energy at the interface of the metal pieces, without application of electrical energy or heat from other sources. The weld is made by holding a non-rotating piece of metal in contact with a rotating one under constant or gradually increasing pressure, until the interface reaches forging temperature. Rotation is then automatically stopped for a short period of time to consolidate the weld. Weld time varies depending on the materials being joined and the stud diameter.



A motor spins one stud at 8000 rpm. Once the optimal speed is reached, the rotating material is lowered to the point of contact with the stationary piece. Almost instantly, both metals become red hot. In this plastic state, the two materials are permanently joined together. During this process, material is lost or displaced, causing the mechanism holding the rotating piece to move an additional predefined distance before the operation is finished. The Models 0236-0000 and 0237-0000 are used on separate applications to sense this displacement. This company has also incorporated the Model 1000-0014 into their welders to simplify the task of conditioning the signal to each LVDT.

Using a transducer from the Series 230 was an obvious choice. It enabled the engineers to focus on their niche: supplying a portable, self-contained friction welder. The Models 0236 ( $\pm 0.500$ " ) and 0237 ( $\pm 1.000$ " ) performed the important role of position control while taking up minimal space.