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# Butterfly Valve Control

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The Trans-Tek Series 600 Angular Displacement Transducer (ADT) offers accurate angular position feedback for strokes to 120°. High precision is specified by non-linearities of  $\pm 0.05\%$  and  $\pm 0.10\%$  available for several working ranges. Discrete, integral electronics provide optimum performance, while delivering a high level DC voltage output directly proportional to shaft rotation.

The ADT design consists of a capacitive element coupled to a solid state oscillator, a demodulator and an amplifier to yield DC-in/DC-out performance. Because of sophisticated signal conditioning electronics contained in the transducer package, the only equipment required for operation is a power supply (with fixed voltage between 12 and 16 VDC) and a suitable readout (such as a 4 1/2 digit voltmeter). Combining the accuracy of costly absolute optical encoders, the infinite resolution of an RVDT and the economics of a precision rotary potentiometer, the Trans-Tek ADT is a superb alternative for angular displacement measurement.

This advantage was discovered by a leading manufacturer of FCC Power Recovery Valves used in the processing of waste gases for petrochemical applications. These butterfly and slide valves excel in reliability and long service while subjected to severe temperature and pressure conditions. Starting with a technologically advanced design, these valves were developed through extensive high temperature operation and seat leakage tests to satisfy the stringent requirements of FCC Power Recovery Systems.

Focusing on a few key features of the butterfly valve: two bushings and two ball bearings, isolated in separate locations, support the stem. The stem diameter is locally reduced where less critical to temperature in order to minimize torque frictional

loss. The streamline valve disc, constructed of two plates convexed and secured together by welding, has a reduced boss diameter to ensure a low pressure loss. Benefitting from a small clearance and the two sets of bushings and ball bearings, stem deflection is alleviated to attain minimal seat leakage with the valve in its fully closed position.

The Model 0603-0002 ADT, with a working range of 20°-140° (offset for a single-ended output) and non-linearity of  $\pm 0.10\%$ , is attached to the end of the valve stem using a flexible coupling assembly. To fixture the ADT, the transducer body is face-mounted to a plate with the shaft passing through a hole in the plate. From this point, the first of the two flexible couplings is fastened to the ADT shaft. A shorter, intermediate shaft leads to the second coupling, which then provides the final connection

to the valve stem. The transducer's output signal changes with the rotating shaft and thereby monitors the exact position of the valve disc.

Inputted directly into on-board electronics, this signal is a main component of a continuous feedback loop controlling flow of the waste gas.

The Series 600 Angular Displacement Transducer is designed and manufactured by Trans-Tek to meet the demanding feedback requirements of numerous OEM and end-user applications. With its integrated supporting electronics and ease of operation, this angular sensor is a simple choice in a complex industrial world.

