

Valve Position Sensing - Analog

Multi-position sensing and tube detection

Introduction

Position sensing is offered on all models of Acro Associate's pinch valves. Position sensing supplies electronic feedback on a valve's position (or state). This feedback confirms that a valve is in the state dictated by a control input. A key benefit to position sensing is that it provides closed-loop control. This allows monitoring of valve function for critical applications. Other benefits include: Multi-Position Sensing and Tube Detection.

Classification by Output Signal

Depending on their output signal, position sensors are classified in one of two ways: analog or digital. An analog sensor outputs a variable voltage signal that changes with valve position. It is possible to detect several valve positions throughout the stroke of the valve. A digital sensor outputs only two states (OPEN or CLOSED). The decision to use an analog or digital sensor depends on the application, the manner in which the feedback will be processed, and the accuracy required of the feedback. This paper details analog output sensors. For digital output sensors, see "Valve Position Sensing – Digital".

Analog sensor output will vary from high to low as the valve moves from CLOSED to OPEN state, and then reverses output in the other direction. Acro's analog sensor provides sinking or sourcing linear output. The output is clamped on the high end.

Classification by Sensor Type

Acro Associates offers only one type of analog sensor: Analog Hall Sensor.

An **Analog Hall Sensor** senses the strength of a magnetic field and changes state when moved through the field. The magnetic field is generated by a permanent magnet which moves with the actuator. When the valve changes state, the permanent magnet travels toward or away from the stationary hall sensor.

Multi-Position Sensing and Tube Detection

Acro's analog sensor provides a variable voltage signal that is linear, predictable and easily correlated to valve movement. While enhancing closed loop system control, this **Multi-Position Sensing** technology has been used successfully to provide real-time feedback on valve position. Another distinct advantage is using it to detect tube presence. Acro's **Tube Detection** will give peace of mind to those needing feedback for the following valve states:

- Tube Out – Valve Closed
- Tube In – Valve Closed
- Tube In – Valve Open

Each state is established by a predetermined change in output. The number of possible position states is application dependant.

Mounting

Acro's position sensors require special mounting as they must interface with a mechanical or magnetic component of the actuator. Acro has one mounting type for analog position sensors. It is the Dashpot (external magnet) mounting.

Dashpot (external magnet) includes models with a permanent magnet attached to a moving component outside the actuator. Frequently used in applications that also require sound dampening, the external magnet is attached to the piston of a dampening device called a dashpot. Sensors for these units are mounted onto the dashpot and add approximately 1 inch to the length of the valve.

Wiring Connections and Power

When interfacing with analog hall sensors, wiring connections and power must be considered.

Analog Hall Sensors require a 3-wire interface: power, ground and output. These are typically driven with a Programmable Logic Controller (PLC), or other low power control signal. Power can be 6.6 to 12.6 VDC and up to 30mA.

To learn more about position sensors or to discuss which position sensor would best suit your application, please contact an Acro Applications Engineer either by e-mail or at 1-800-672-2276.

About Acro Associates

Acro Associates, Inc. is the leading innovator of high performance fluid control systems. Our designs maximize reliability and repeatability of fluid control in medical devices and bio-processing equipment. Our dedication to meeting customers' needs is unsurpassed.

We offer products and services that can utilize any selected portion or the full range of our capabilities— from engineering design, prototyping and pilot production to full-scale production manufacturing and quality control. In addition, we also offer fully customized solutions tailored to individual customer requirements.

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