

## How Sensors Are Used in Fluid Power Systems

Sensors are used as input devices in fluid power systems to indicate that a condition has been, or has not been, met. Sensors can be used to monitor pressure, flow, or position. By integrating time with position, velocity, either angular or linear, may be determined.

### Digital vs. Analog Sensors

Sensors can be divided into two general groups: those that provide a digital (on or off) signal and those that provide an analog (varying voltage or amperage) signal.

Most sensors used in fluid power systems are simple switches. Switch contacts, being either open or closed, provide a digital signal. If when the switch is in its un-actuated state the contacts are closed, allowing current to flow through the switch, the switch is termed a normally closed switch. If the switch contacts are open when the switch un-actuated, the switch is termed a normally open switch. However, some switches have three contacts. This type of switch may be connected so that in its un-actuated state current either does or does not flow through the switch. Variations on this type of switch include one which has six contacts, effectively providing two switches enclosed in one housing.

Switches are rated by the amount of current and voltage for which they are rated. For example, a switch may be rated to 5 amps at 240 volts. If the switch is used in a circuit in which the amperage or voltage exceeds these limits, arcing at the switch contacts is likely to occur with resultant damage to the contacts.

Analog sensors provide an analog output signal. Sometimes it is not enough to simply know that a condition, such as a specific pressure, has been met. Instead, the amount of pressure throughout a range needs to be monitored. If only two or three discrete points need to be monitored, one solution would be to have multiple pressure switches each set for a specific pressure. This solution quickly becomes expensive as there is the cost of the switches, installation hardware, and time to consider. Though a pressure transducer is generally more expensive than a pressure switch, one pressure transducer usually is less expensive than three pressure switches. If the transducer is connected to a PLC (programmable logic controller) the transducer signal will need to be connected through an A to D (analog to digital) converter. Offsetting the cost of an A to D converter is the fact that individual pressure switches each require a connection to the PLC. If you need to monitor three pressure switches three PLC inputs will be used. As the number of input and output connections on a PLC increases, so does the cost of the PLC.



Fig. 1: Pressure Transducer











