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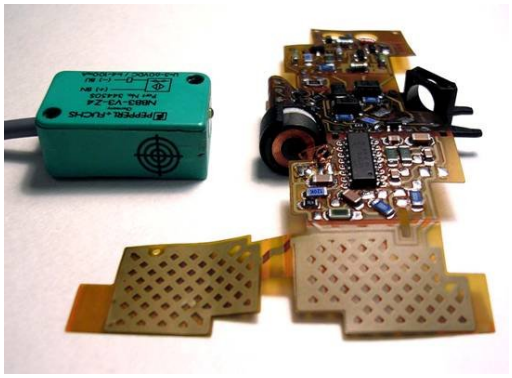
An introduction to the different switch types used for valve monitoring

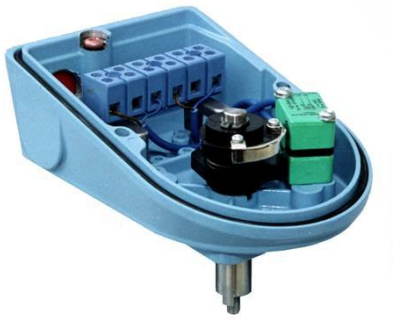
Clients will have certain preferences when selecting a switch type for actuator monitoring. Here are some definitions:

A mechanical micro switch relies on contact from a switch cam for operation, there are moving contacts within the switch and ingress protection is provided by the switchbox enclosure. (This switch costs less than a reed or solid state proximity switch). The contact options are defined as S.P.S.T (Single pole, single throw – two wires per switch), S.P.D.T (Single pole, double throw – three wires per switch although sometimes the switch is used with just two wires and functions like a S.P.S.T switch) or D.P.D.T (in effect this is two S.P.D.T sets of contacts in a single switch – four or six wires per switch).

A reed switch is sometimes referred to as a proximity switch but it is important to distinguish between a reed switch and a solid state proximity switch. A reed switch operates when a target magnet comes in close proximity to the switch, there are moving contacts within the switch but they are sealed from the environment by both the switchbox enclosure and the switch itself. (This switch costs more than a mechanical switch but less than a solid state proximity switch). Like a mechanical switch the contacts in a reed switch are defined as S.P.S.T (Single pole, single throw) or S.P.D.T (Single pole, double throw).

A solid state proximity switch is more complex and operates when a metal target comes in close proximity to the switch, there are no moving contacts within the switch and the solid state electronic components are sealed from the environment by both the switchbox enclosure and the switch itself. (Costs more than a mechanical or reed switch). There are two or three wire versions designed to switch a variety or currents and voltages.





The photograph above shows from left to right: 1) A "two wire" 5 -60 VDC solid state proximity switch for safe area use. 2) The internals of such a switch showing the electronic components laid out on a flexible backing that is folded together prior to encapsulation. 3) The internals of a 007 Switchbox designed for use in intrinsically safe systems. As electronic components can store or induce energy the component count is kept to a minimum in intrinsically safe proximity sensors.

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As a result of the lower component count the switching is carried out in a remote safety barrier situated in the safe area. Intrinsically safe proximity sensors (also known as" Namur" sensors) should not be selected for use in a safe area because without an associated safety barrier they will not switch any current. Note that we refer to an intrinsically safe version as a "proximity sensor" and an AC or DC version for safe area use as a "proximity switch".

Each application should be individually assessed. Please contact K Controls.

Three further documents are available that deal with mechanical, reed and inductive proximity switches in detail.