

## Industrial Robotics and Automation

Every hydraulic or pneumatic cylinder or actuator requires a reed sensor for end position sensing. Unlike inductive sensors or Hall-effect sensors, reed sensors use no power and have a good isolation. They have high operating speeds, work with a wide range of voltages of programmable logic controllers (PLCs) and micro-controllers. When used with weak magnets, reed sensors can also detect any ferrous parts. The following applications use reed sensors.

### Safety Vane applications

Optic sensor lenses need to be exceptionally clean for vane sensing applications. A reed switch and a magnet are combined into one package with a specific distance between them to form a normally closed (NC) vane sensor. When ever a ferrous part comes between them, the magnetic field is shunted and the reed switch opens. Normally open (NO) vane sensors can be designed by using a normally closed reed switch on one side and a magnet on the other side which is strong enough to keep the NC reed switch open. Reed switch based vane sensors can work in very dirty industrial environments and grease and dust do not affect its working. Common applications are conveyor belt part sensing, industrial mixer speed sensing, etc. Suitable products: **MM-1018** and **UM-0018** ultra-miniature reed switches in vane sensors.

### End position sensing in Cylinders and Pistons

Most pneumatic cylinders, pistons, linear slides and rotary actuators are manufactured with inbuilt magnets for end position sensing. Reed sensors are used to sense end positions and intermediary positions and the signals can be used by PLCs for processing further instructions. The very high sensing speed of reed sensors work well with the high program scanning speed of PLCs. Reed sensors can also be coupled by LEDs to help with easy positioning after the piston and cylinder strokes or rotary actuator angles are adjusted. Suitable products: **MS-225** and **MS-228** position adjustable sensors.

### Ferrous part detection

Ferrous part detection sensors are built by positioning two weak magnets near the seals of reed switches. The two magnets are by themselves not strong enough to transfer the magnetic flux lines between them and close the reed switch. If this system is brought near a ferrous part, the flux lines travel through the ferrous part and enlarge the two smaller field into one big field which close the reed switch. Ferrous detection sensors can be used in a wide variety of applications in pick and place units etc. Suitable products: **SM-1322**, **MO-1422**, and **MC-1425** reed switches with cropped leads.

### Gear speed and direction sensing

Miniature ferrous part detection sensors can be positioned near gears to sense the speed of rotation. Reed switch based sensors have very high sensing speeds and can sense up to 30,000 RPM. Special ferrous part sensors which can sense gear direction are built with two reed switches and a biased magnet and combining this system with a D-Flip-flop for quadrature sensing. One of the reed switches is connected to the D input, and the other clocks the input. This way, one direction is differentiated from the other by monitoring the output Q of the D-FF. Suitable products: **SM-1322**, **MO-1422**, and **MC-1425** reed switches with cropped leads.

### Bridge control in Airports

The bridge operator needs to steer the bridge toward to airplane door for docking. When the bridge is about one metre from the door, the height of the bridge needs to be adjusted. This is accomplished by positioning reed sensors and a magnet in the bridge mechanism. The bridge operator gets feedback from the reed sensors as to exactly how much the bridge is moving up or down. After successful adjustment of the height, the bridge can then be docked with the aircraft door. Suitable products: **MS-225** and **MS-228** position adjustable threaded sensors.

### Transformer tap changers

Tap changers in transformers involve protection and control schemes and one of them is to sense if the tap changer assembly is in odd or even position. A magnet or a set of magnets mounted on the moving assembly arms trigger a reed sensor mounted on the transformer. Since this assembly will be located inside the oil tank of the transformer, special reed sensors capable of withstanding high temperature are used. Suitable products: **HW-5052** reed switches and **HW-5052** reed switch based sensors with heat withstanding body.

### Petrol and Diesel Pumps

Petrol and diesel pumps use reed switches to sense if the nozzle has been placed in the holster properly so that the last volume filled display can be reset to zero. A tiny magnet on the nozzle handle can activate a reed sensor mounted inside the holster. Reed switch based flow sensors, when used with very low level sensing loads such as 10V/10mA can operate up to a billion operations. These encoder type flow sensors are used to calculate the actual petrol pumped, and the volume can be displayed on digital panels. Suitable products: **MS-10x** miniature PCB mountable reed sensors, and goal post formed **MM-1018** and **RM-1318** reed switches.

### High voltage relays

The power industry uses many types of relays for signal switching as well as high voltage and high current switching. Special reed switches with high breakdown voltage, capable of switching high wattages are used to manufacture relays that can carry as high as 5 amps. Multiple reed switches can be used in reed relays to manufacture different contact forms, for example, two normally open contacts and three normally closed contacts which can be actuated with voltages as low as 5 volts. These kinds of relays not only save power, but can also simplify circuit switching logics. Suitable products: **LV-1925** and **HW-5052** reed switches.

Due to continual improvement, specifications are subject to change without notice

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