



RELIABLE REED SWITCHING

BEST PRACTICES FOR NORMALLY CLOSED APPLICATIONS

There are many applications where a device need not be fully on all the time, but must nevertheless be ready to function when needed. In some applications, the device may be "asleep" for weeks, months, or even years, imposing challenges on both conservation of limited battery power and the necessity for reliable switching when the time is right. Often times, this means utilizing a form-A (normally-open) switch and holding it shut with an applied magnetic field. This closed state is often tied into a microprocessor's hibernate mode, so that when the magnetic field is removed it triggers between different power modes.

Reed switches themselves do not have any leakage current or the need for a third "supply voltage pin" associated with them, keeping power consumption to a minimum.

Molded reed switches are ideal for this sort of mode switching, sometimes termed "wake-up" functionality. The magnetically sensitive contacts will open when a magnetic field is removed from the vicinity (such as pulling the device out of its container where a small magnet was hidden or pulling an "activating" tab off of a device that contains the magnet, aka the "out of the box experience") and unlike other magnetically sensitive devices, reed switches themselves do not have any leakage current or the need for a third "supply voltage pin" associated with them, keeping power consumption to a minimum.

However, there are some guidelines that are worth following in order to have the most robust design possible in these types of applications. Because the contacts are kept closed for long periods of time, there is the possibility that they can "stick" shut, meaning that the contacts do not open when the magnetic field is removed. There are a number of reasons why this may happen, but two critical design considerations can avoid this issue in the vast majority of cases.

Less sensitive switches, meaning those with a higher AT or mT operate rating, are recommended in all form B applications. If you think of a reed contact blade as a springboard (e.g. a diving board at your local swimming pool), then when the blades are brought closed by a magnetic field there is a spring force present caused by the deflection of the blades from



their normally-open resting state. Higher AT/less sensitive switches have a wider contact gap, requiring greater blade deflection to close the gap. This greater deflection creates stronger springback forces in the blades when the magnet is removed, thereby pulling the blades apart more forcefully than with a low AT/more sensitive switch.

Along with a less sensitive switch, a stronger magnet is likewise recommended. This compensates not only for the stronger field required closing a less sensitive switch, but sufficient magnetic overdrive (i.e. magnetic flux density above the minimum required to close the switch) maximizes the contact area between the two blades. This reduces the chance of a "soft" closure, which can lead to damage on the contact surfaces and impact reliability.

To learn more about Coto Technology's molded reed switch offerings, including our CT10 and CT05 series, and how our applications support team can help you with your latest design, please contact us at www.cotorelay.com.



CT05 Datasheet

CT10 Datasheet