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# Medical membrane switches

## Whitepaper



# 10 tips for medical membrane switches

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## The popularity of membrane switches for medical equipment

Medical equipment is only as good as its weakest component. The user interface is usually the part of the device that is handled most frequently. Many medical devices use membrane switch technology for their user interfaces. And not without a reason, membrane switches offer extended reliability and durability, making them the ideal control solution for medical equipment. They are used in a wide range of applications such as hospital beds, infusion pumps and vital signs monitors. In this paper we share 10 tips why you should consider membrane switches for your medical devices.

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## #1 Keep devices clean and hygienic

Hygiene is priority number one in medical environments. One characteristic that makes membrane switches very suitable for medical equipment is the easiness to clean the exterior layer. The surface is smooth and can be completely sealed. We will tell you more about sealability in our second tip. The material is also designed to withstand various cleaning and disinfecting agents. Traditional keypads have spaces between the keys, which comes with the risk of dust or other forms of pollution 'falling through'. This is a threat for medical environments, because of the possible risk of mold or the growth of bacteria.

The level of hygiene does not stop at disinfection materials. The use of antimicrobial technology adds an extra level of safety. It is possible to integrate a hard coated antimicrobial front film, for long-term protection of membrane keyboards against bacterial contamination.

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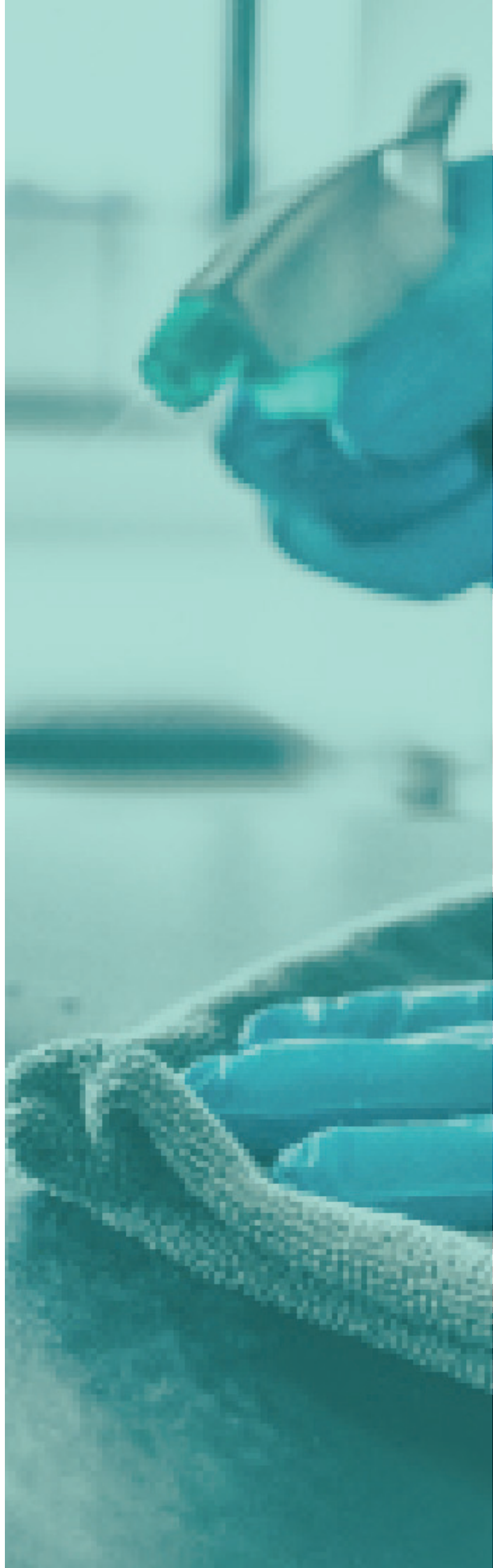
## #2 Sealability of membrane switches

One of the biggest threats for user interfaces is the risk of water, chemicals or other substances entering through the empty spaces in the socket, which can cause a short circuit. Membrane switches can be completely sealed off against these external influences. Switches offer a water resistance up to IP67 and also protect the user interface against scratches.

## #3 Space saving alternative

Membrane switches are also a good alternative to save space on devices. Compared to mechanical switches and buttons the components are known for their flat design, low weight and small size. This way even when the available space is limited, membrane switches can be easily incorporated into product designs. They also bring a more modern look, away from the older bulky looking mechanical switches.

## #4 Durability in harsh environments

Membrane switches have always been the technology of choice for environments that require a high level of robustness. They can last a long time in harsh environments and are able to handle a high number of 'pushes'. Membrane switches typically have four or more layers. The top layer is the graphic overlay, with the graphics hiding safely on the backside of the surface. Membrane switches will remain to look great, no matter how many times they are cleaned or used. Also, the overlay materials are known for certain characteristics that make them very durable, such as polyester, polycarbonate, silicone or combinations of these materials.

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## #5 The support of tactile feedback

Tactile membrane switches, equipped with metal domes or plastic polydomes, deliver an immediate physical feedback when pushed. Such a snap action is a very effective way of user feedback for medical personnel that is controlling a device, while keeping eye contact with the patient. Medical staff cannot spend unnecessary time interacting with medical devices, they need to get back to their patient as soon as possible. Therefore, user experience is essential when developing membrane switches for medical devices.

## #6 High level of customizability

Compared to mechanical switches, membrane switches are relatively easy to customize to meet specific customer needs. They can be integrated with features such as wireless connection via printed NFC, BLE or WiFi antennas, seamless integration of capacitive touch sensing and visual feedback for users through the integration of LEDs or electroluminescence.

## Membrane switches offer extended reliability and durability, making them the ideal control solution for medical equipment.

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## #7 Visibility with a graphic overlay

The graphic overlay is the outermost layer of the membrane switch. Graphic overlays on medical equipment can be viewed from a 180 degrees radius and at a distance. When using other user interfaces (such as touch screen) this high level of visibility is not possible. The graphic overlay can also be customized to meet almost any aesthetic specification, for example by using different colors.

## #8 The power of backlighting

Backlighting can make the graphic overlay more visible and improve usability. Medical staff can immediately see warning lights or other functional indicator lights. For example, you can use backlighting as an indicator to show certain functions are active. In the case of a medical device you can think of a green light to show a medical device is turned on. LEDs are a popular choice, because of the low-cost, point-source lighting method and the various colors available.

## #9 Integration of shielding

Membrane switches can also be customized with different shielding options. This way they can provide protection against Electrostatic Discharge (ESD), Electromagnetic Interface (EMI) and Radio Frequency Interface (RFI). These shielding methods are possible to be integrated into the membrane switch construction by using foil, transparent film or printed screens.

## #10 RoHS compliance

In general, membrane switches comply with RoHS regulations (Restriction of Hazardous Substances). RoHS restricts the use of specific hazardous materials found in electrical and electronical products. Membrane switches meet these strict standards, by using polyester film and polymer ink.

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At Quad Industries we design, develop and produce membrane switches, capacitive touch solutions and printed electronics for medical devices.

- Our expertise and technical knowledge are your guarantee for state-of-the-art solutions that meet all your needs.
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## Get in touch

Want to find out how we can help you? We do love to hear about your plans. Let's meet up!

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