Frequently Asked Questions About Switch, Potentiometer & Circuit Breaker Hermetic Seals

Q ***How do you determine if an unsealed panel-mounted switch requires a hermetic sealing boot?***

A It's a matter of risk-assessment and good business judgment. The more hostile the environment, (the presence of moisture, dust, dirt, lubricants, cleaning solvents, anything that can generate fungus, corrosion that will impede contact or actuator function like ice build-up) the higher the requirement for these environmental protection sealing boots. Also, if your equipment is sold under warranty, it's much cheaper to anticipate and protect the internal switch mechanism than to risk a field failure and expensive repair. So, although the initial cost may be greater because of the inclusion of the boot, the real cost is negligible when including labor and customer satisfaction.

Q ***Does UL, CSA or the Military recognize HEXSEAL® & E-SEEL® sealing boots?***

A Yes, UL has awarded their Recognized Component Listing Symbol to our boots and most are manufactured to meet MIL-DTL-5423, which is the governing specification for electronic component environmental protection. No other competitive sealing boots in the world have these approvals. As part of this process, both UL and the military regularly inspect our facilities and products. Therefore, you can have the confidence of third party inspection.

Q ***Why do some customers order sealing boots for sealed switches when they are already factory sealed?***

A Although this category is comprised of switches that are hermetically sealed (to protect the contacts from being corroded or otherwise contaminated), their panel mounting holes are still exposed to moisture and leakage penetration. Every HEXSEAL® and E-SEEL® is designed with a patented perimeter seal that surrounds and vacuum protects the mounting hole and prevents bad things from reaching exposed circuit boards, etc. Pre-sealed switches can also achieve mounting hole protection from our new silicone bonded Shaft-Bushing Washer-Seal — part numbers 60064 & 60225. This is a highly efficient solution and a superior method than using a simple O-ring. See Bulletin PBS-100 for more details. Also, environments that are exposed to very fine dust particles, such as cement, flour, bad weather, etc., a build-up can occur in the switch actuator well impeding smooth operator function. Also, ice can form around the actuator causing freeze-ups. Therefore, a silicone sealing boot is still needed to act as a total barrier and should be considered for sealed switches as well. *Think outside the switch*.

Q ***Your catalog states that HEXSEALS® & E-SEELS® are supplied in either black or gray color. Can they be ordered in any color, or in a transparent form?***

A Definitely. We can match the elastomer material color precisely to the customer's color specification. This request is becoming increasingly popular for function/panel color matching.

Q ***Can APM provide EMI/RFI Suppression Capabilities to these boots?***

A Yes. Up to 120dB of shielding effectiveness can be provided to select toggle, pushbutton and rotary sealing boots. Many telemetry, medical and military applications call for this enhanced capability. Consult catalog HEX and Bulletin EMI-100 for more details.

Q ***Can APM provide additional metric and other thread sizes for its integrated switch seal mounting nut, other than described in catalog HEX-200?***

A Yes. Consult factory for assistance. This is a frequent request that we will gladly accommodate at no additional cost.

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Q ***At first glance, most switch seals seem to look alike. Is there really any difference?***

A Absolutely. APM HEXSEAL invented and patented the environmental seal concept for electrical controls. For example, our unique toggle switch "Nautilus" design characteristics includes a dual chamber that hugs the actuator, creating an inner sealed barrier which prevents contaminant penetration from reaching the internal mechanism. Also, by having an inner barrier a secondary defense is created. Should there be an accidental puncture or tear, contaminants will not be able to penetrate to the inner switch mechanism. Its single-piece design (the original switch mounting nut is replaced with a molded-in mounting-nut cross linked bonded to the silicone seal housing) is designed to precision tolerance so the tactile feel is compatible with the switch itself and does not interfere with smooth operation. A critical factor is also the use of the precise silicone durometer. This is how we designed the entire line; always keeping in mind ergonomic and actuator considerations. In many instances, these switch and boot combinations have to be operated with a gloved hand — often in extreme temperatures. The APM advertising slogan says it best; "Hexseal Proving Grounds — World's Most Hostile Environment"

Q ***What about some of the so called inexpensive neoprene rubber sealing boots that are sold as companions to their miniature toggle switches by some switch companies? How do they compare to APM's precision one-piece silicone rubber boots?***

A Frankly, they don't. To begin with, these boots aren't UL or CSA listed. Neoprene, the elastomer frequently used, does not possess the rugged characteristics or life expectancy that silicone has, such as high tear strength or wide temperature range and overall resistance to hostile contaminants. Their design usually consists of a crimped or separate mounting-nut (not cross linked bonded like the HEXSEAL/E-SEEL). ***Unlike APM HEXSEAL boots, they DO NOT feature our patented perimeter sealing rib for the protection of the switch mounting hole, and their IP ratings do not measure up to APM's IP66/IP68 ratings even when they offer silicone rubber***.

Q ***Are there HEXSEAL® switch sealing boots with enhanced exterior protection for high-pressure/high-temperature cleaning applications and rough handling?***

A Yes. Two switch types of armored boots are available and both are IP66/68 ingress rated, UL & ULC Recognized (UL Std. 50), manufactured to meet stringent MIL-DTL-5423 specifications. The pushbutton switch model is surrounded by a full stainless steel (series 300) armor enclosure which incorporates an embedded elastomeric bladder type membrane. A toggle type is also available for less extreme situations and it features a bonded nickel-plated cap that protects the upper half of the boot. These armored boots are ideally suited for applications in food, beverage, dairy, pharmaceutical and petrochemical processing industries and marine, construction and other heavy-duty equipment. They have an operation life expectancy of 100,000 plus and a temperature range of-80°f to +400°F (-62°C to +204°C). See catalog HEX and Bulletin AP-100 for details.

Q ***Can APM circuit breaker sealing boots be mounted on the outside of NEMA enclosures without compromising the enclosures' integrity?***

A Yes. APM's UL listed switch and circuit sealing boots represent an acceptable cost-effective solution where the user application requires external mounting of sealed electrical controls on NEMA type enclosures. They meet the requirements of UL Standard 50. NEMA enclosures for motor and other controls are typically found in machine shops and various metalworking environments that are often characterized as having cutting fluids, lubricating oils and metal chips. NEMA enclosures which are used for outdoor applications benefit from our silicone cover material which is UV resistant. A wide range of lever, toggle, pushbutton and rocker style boots are offered for panel mounting.