Molex's tactile and non-tactile membrane switches, available with and without light-emitting diodes (LEDs) provide a durable, light-weight and low-profile option for adding simple electronic components onto a flexible substrate for medical, industrial and commercial applications

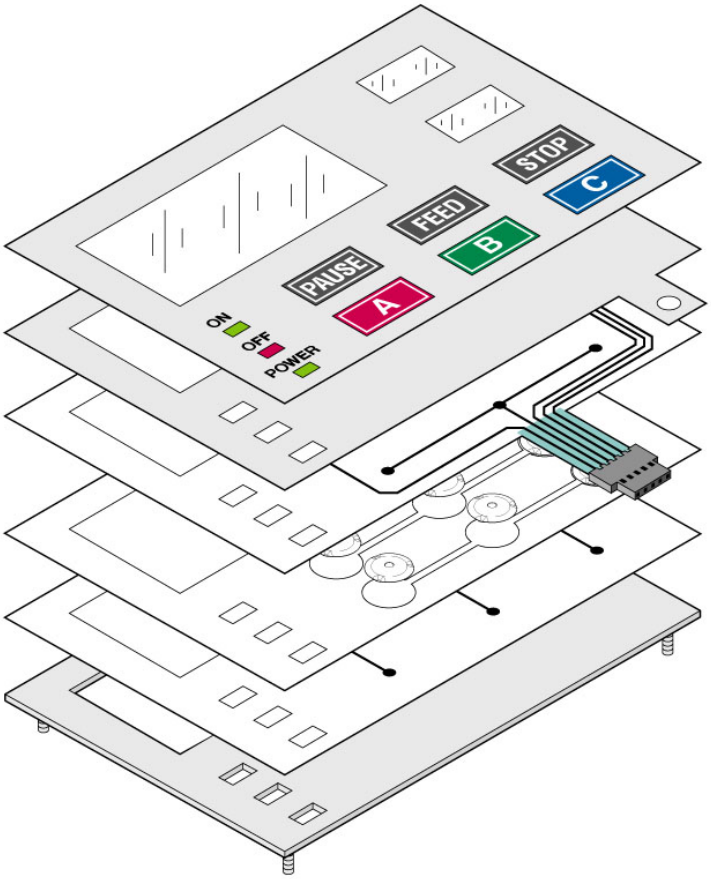
Membrane Switches

A membrane switch is a thin, low-profile, micro-motion, front-panel assembly with one or more layers of polyester. Screen-printed conductors are printed on each layer and pressure-sensitive adhesives are used to bond the polyester layers together. The assembly may also include passive electronic components, such as resistors or capacitors that are adhered to the membrane switch substrate using conductive adhesive technology.

Molex's low-profile membrane switches are light weight and permit integration into smaller and thinner packages. Membrane switches are available as either tactile or non-tactile. The tactile element provides a "snap" or tactile sound when the switch is actuated. LEDs are available upon request to provide a bonded LED assembly.

FEATURES AND BENEFITS

- Light weight and low profile to permit integration in to smaller and thinner packages.
- Easy to shield which offers protection against static discharge and EMI/RFI.
- Extremely resistant to shock and vibration for exceptional performance in commercial applications.
- Durable to meet the needs of rugged and high-usage applications.
- Capabilities exist to bond simple electronic components
- Superior tactile response that is consistent from switch to switch and withstands even the most rugged commercial environments
- Well-suited for harsh enviornments and medical applications



SPECIFICATIONS

Material

Circuit Sheet: Polyester film of a specified thickness with conductive thick film circuitry

Conductive Thick Film: Composition of fine silver particles suspended in resin, exhibiting typical sheet resistance of .025 Ω per square at .02mm (.001") unless otherwise dictated by application

Spacer Sheet: Polyester film of a specified thickness that may have adhesive on both sides. The spacer contains openings that act as through holes for the contact of silver pads on the circuit sheet

Dome Retainer: Polyester film of a specified thickness that has adhesive on both sides. Contains opening that act as a "nest" in which the stainless steel dome is contained.

Dome Insulator: Polyester film of a specified thickness that has adhesive on one side. May be used in some configurations to provide an insulating surface on which part of the dome may rest. This provides insulation between a silver conductor and the dome in a tight matrix design.

Mounting Sheet: Free film or polyester supported adhesive with release backing.

Graphic Sheet: Decorative overlay of plastic film, typically polyester or polycarbonate, of a specified thickness. May have pressure sensitive adhesive on the back side.

Flex Tail Cover: Polyester of a specified thickness with adhesive on one side or screenable coating with specified dielectric properties.

Electrical

Contact Rating: 30ma at 28V DC

Durability: 1 million operations at maximum contact rating

Circuit Resistance: 100 Ω max. typical. Total loop resistance at termination depends on circuit configuration.

Contact Bounce: 20 milliseconds max.

Insulation Resistance: 100 M Ω initial between adjacent lines

Silver Migration: 24 hours in 40°C at 90-95% RH with 5 DC applied. Design dependent

Available Circuit Codes: Any combination of normally open momentary contact arrangements

Dielectric Withstanding Voltage: Polyester Circuit Sheet: Short term dielectric strength test per ASTM-D149

Dielectric strength vs. thickness with 50.80mm (2.00") electrode in air at +20°C is 3500V per mil with .13mm (.005") thick film

Effect of electrode size on dielectric strength is 3500V per mil with 50.80mm (2.00") electrode and 3200V per mil with 6.35mm (.250") electrode

Dielectric strength vs. temperature with .13mm (.005") thick film is 3500V per mil at +25°C to 3000V per mil at +150°C

Dielectric strength as it relates to various humidities:.13mm (.005") thick film is 3200V per mil at 80% RH and 3800V per mil at 20% RH

Dielectric strength of flex tail covering and contact gap will vary depending on construction

APPLICATIONS

- Appliance controls
- Medical front panels
- Point-of-sale terminals
- Industrial controls
- Consumer products
- Cellular communications
- Telecom and datacom

Membrane Switches

Mechanical

Actuation Force: 8 to 18 oz. typical. Varies with construction of switch, including dome retainer thickness and graphic options, and tactile force of the dome used.

Button Travel: .38 to .46mm (.015 to .018") typical depending on dome specified

Switch Thickness: .48 to 1.40mm (.019 to .055") typical depending on graphic and mounting options

Shock: 50g, 3 hits on each axis per MIL-STD 202F, Method 213B, Condition A. Switches are monitored for closures during test.

Vibration: Per MIL-STD 202F, Method 201A with 30ma at 28V DC load applied. Switches are monitored for closures during test.

Conductor Adhesion: Capable of withstanding 6 insertions and extractions of any Molex connector designed for silver conductive ink and then carrying rated load. Capable of withstanding an abrasion taber test with a specified number of cycles and weight. After test, there should be no increase of termination resistance beyond the specified limits.

Flex Tail Strength: Five 180° clockwise and counterclockwise bending cycles flat around a .79mm (.031") radius. No cracking, flaking or delamination should be detected under a 30X microscope. After test there should be no increase of termination resistance beyond specified limits.

Environmental

Storage Temperature: -40 to +70°C typical depending on specific switch configuration and application requirements

Humidity: Per MIL-STD 202F, Method 103B, Condition A*

Thermal Aging: 96 hours at +70°C, then 96 hours at -40°C*

Thermal Shock: Per MIL-STD 202F, Method 107D. 5 Cycles of -40°C for 30 minutes, then +70°C for 30 minutes

*After test, parts must meet electrical characteristics as specified above.

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