

Membrane Switches Specifications

Mechanical properties				
	Non-tactile	Metal dome	Polydome	Comments
Dimensional tolerance	According to tolerances given on Danielson drawings			General knife tooling +/- 0.2mm
Operation force	≤ 2N	≤ 5N	≤ 5N	ASTM F1597-02
Key travel	Typically: 0.30mm	Typically: 8mm dia 0.35mm 12mm dia 0.60mm	Typically: 0.50 - 0.80mm	ASTM F1682-02
Contact surface	Customer specific: - Flexible base and top circuit: silver or carbon - PCB base circuit: tin/lead, carbon or gold plated - Metal domes: nickel or gold plated			
Actuation life				
Polyester overlay	> 3x10 ⁶	> 1x10 ⁶	> 1x10 ⁶	@ ambient conditions (20°, 50%RH)
Polycarbonate overlay	100,000	Not recommended	Not recommended	@ ambient conditions (20°, 50%RH)
Emboss height	≤ 0.5mm	≤ 0.5mm	≤ 0.5mm	
Emboss spacing	> 3.0mm	> 3.0mm	> 3.0mm	Note: minimum width of rim embossing 1.00mm
Minimum bend radius tail	4.0mm	4.0mm	4.0mm	

Electrical properties				
	Non-tactile	Metal dome	Polydome	Comments
Contact bounce time	< 3ms	< 10ms	< 20ms	ASTM F1661-96
Typical closed switch loop resistance with all-silver tracks	≤ 100Ω	≤ 100Ω	≤ 100Ω	ASTM F1680-02
Closed switch loop resistance, with carbon cross-over tracks	≤ 5kΩ	≤ 5kΩ	≤ 5kΩ	ASTM F1680-02
Insulation resistance				
Without crossover design	≥ 10MΩ	≥ 10MΩ	≥ 10MΩ	ASTM F1689-02
With crossover design	≥ 100kΩ	≥ 100kΩ	≥ 100kΩ	ASTM F1996-01
Dielectric strength polyester				
125μ	15kV	15kV	15kV	
175μ	18kV	18kV	18kV	
250μ	21kV	21kV	21kV	
Capacitance	< 25pF	< 25pF	< 25pF	
Operating (switched) voltage	Min.0.5V Max 30V	Min.0.5V Max 30V	Min.0.5V Max 30V	
Operating (switched) current	≤ 50mA	≤ 50mA	≤ 50mA	
Operating (switched) power	Max 1W	Max 1W	Max 1W	Resistive circuit
LED typical operating voltage	1.9 to 4.0V	1.9 to 4.0V	1.9 to 4.0V	
LED typical operating current	20mA	20mA	20mA	

Environmental properties				
	Non-tactile	Metal dome	Cold-formed polydome - overlay and/or circuit layer	Comments
Operating temperature	-20°C to +70°C	-20°C to +70°C	0°C to +40°C	No dew condensation allowed at 50% RH
Storage temperature	-40°C to +80°C	-40°C to +80°C	-30°C to +50°C	No dew condensation allowed at 50% RH
	Non-Tactile	Metal Dome	Heat-formed – circuit layer only	Comments
Operating temperature	-	-	0°C to +60°C	No dew condensation allowed at 50%RH
Storage temperature	-	-	-30°C to +70°C	No dew condensation allowed at 50%RH
	Non-Tactile	Metal Dome	Polydome	Comments
Other properties				
Operating humidity	≤ 90% RH	≤ 90% RH	≤ 90% RH	No dew condensation allowed at 50% RH
Storage humidity	≤ 90% RH	≤ 90% RH	≤ 90% RH	No dew condensation allowed at 50% RH C
UV exposure	Normal Polyester not resistant – UV resistant velvet texture material available on request			
Shielding & protection				
Environmental	Sealing to IP67 can be achieved; subject to design considerations			
EMI / RFI	Design specific			Refer to Danielson's test results
ESD	Design specific			

Product evaluation	
Membrane Switch evaluation norms:	
ASTM	Visual inspection properties: F1595-00 Mechanical properties: F1597-02, F1682-02, F1578-01 Electrical properties: F1680-02, F1689-02, F1996-01
IEC	Environmental properties: 60068-2-14 (-25°C to +70°C, 50% RH, 3h/3h, 6 times) 60068-2-30 (cycling to +55°C, 93% RH, 2 times) 60068-2-3 (+40°C, 93% RH, 21 days)
Warranty	
Functional	One (1) year warranty after the date of delivery on Membrane Switch panels. This applies only on the functional aspect and is subject to Danielson's terms and conditions.
Visual	Visual errors can only be accepted within 30 days of the date of product shipment. Appropriate handling precautions must have been taken. Products must not have been badly handled, assembled or used in the end application.

Danielson can incorporate a wide range of features into a Membrane Switch panel.

Polydome	Membrane Switch design options and Features			
	Elastomeric			
Construction				
Flexible without support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexible with support panel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexible with PCB base	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PCB	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overlay and Graphics				
Polyester (normal & UV resistant)	Self-textured, gloss and semi gloss			
Embossing	Rim, frame, deboss, pillow and dome			
Locator plate	Machined finger locator plate laminated onto graphic overlay			
Printing				
Selective surface lacquers	Texture, gloss, semi-gloss and matt			
Image graphics	Matched to specific requirements			
Display filter windows	Translucent and transparent windows to accommodate LED, LCD, VFD, CRT, etc. displays, dead front and secret until lit features			
Electromagnetic Shielding	A variety of integrated shielding solutions are available from Danielson to meet EMC and ESD requirements			
Other features				
Integral components	Surface mount LEDs, resistors, diodes, rotary switches			
Electroluminescence (EL)	Provides cool, even illumination to displays, graphics and switches used in low ambient light conditions			
Support panels	Aluminium, steel, plastic, fibreboard			
Insert legend	Insert labelling provides information flexibility and a degree of product standardisation			
Chemical resistance	A combination of materials and coatings can provide enhanced resistance to a variety of chemicals, solvents and cleaning fluids			
Environmental sealing	Sealing can be improved subject to design considerations			
Turnkey solutions	If the value of your product can be enhanced by incorporating additional electronics or by designing in more than one technology, for example a backlit Membrane panel with Touch Screen, then Danielson has the experience and expertise to bring your ideas to life			