

# Handling Guidelines for Product Containing Tactile Domes, Windows & SMT Components

VIS produces product that contain tactile domes, windows and SMT components. As a result, there are certain things that need to be considered during the careful handling and lamination of the membrane switch to the final product.

The following is a summary list of handling **DO's** and **DON'Ts**:

- NEVER** roll the membrane switch on to the surface of the final backing substrate. The switch should be aligned and then lowered down as a flat plane.
  - Rolling a membrane switch onto the surface of the subpanel (as one might with a label or graphic overlay) can damage the domes (similar to stress on keys in unsupported manner, see below) or dislodge SMT components embedded in the switch array.
  - Rolling a membrane can also cause excessive flexure of the substrates and delaminate the optically bonded rigid windows.
- NEVER** actuate tactile keys while in the unsupported position. Flexing the tactile domes (either polydome or steel snap dome) prior to final mounting on the subpanel can cause: (1) over-travel of the dome or (2) bending one or more legs on the dome.
  - Over-travel: Causes the dome to be flexed beyond bottom-dead-center. This can create a bi-stable condition in the dome. Such a dome will remain in the collapsed (CLOSED and does not "snap" back) position after actuation force is released.
  - Bending of legs: A bent leg on a tactile dome provides a weak point for inconsistent return forces. Such a dome may remain collapsed and/or have very low tactile response.
- ALWAYS** laminate switch assembly to rigid subpanel with a suitable roller (typically 35-45 Durometer, Shore "A" hardness) and/or a proper template. Never burnish or press with hard/sharp objects.
  - Templates are rigid plastic or metal plates that have relief areas cut out or machined as counter-bores to allow uniform pressure on the switch without putting pressure or stress on tactile switches and/or SMT component locations.
- NEVER** actuate an SPST-NO tactile key with a pen, screwdriver, stylus or any other actuator.

Membrane switches are specifically designed to be activated by finger actuation.

  - Actuation with any hard, sharp and/or small diameter object can cause damage (dent) to the transition ring of the tactile dome. Once damaged - even slightly — the dome is unstable and prone to premature failure.
- NEVER** store or operate a membrane switch assembly outside of storage and/or operating temperature range(s), respectively.
- DO NOT** store membrane switches more than 24 months without laminating to subpanel. The pressure sensitive adhesive (PSA) on the rear of a membrane switch has a shelf-life
- NEVER** touch the rear windows underneath the protective premask. The windows are either high-gloss or treated for antiglare qualities. In both cases, they should be handled with care to preserve their optical characteristics as shipped from VIS factory. The windows should ONLY have the premask removed after assembly. Care should be taken to avoid touching the windows with any object—even fingers (gloved or ungloved).
- NEVER** remove the premask unless it is to be immediately mounted to its final surface. The premask is there to keep scratches, dirt, dust, etc. from contaminated in the optical window
- NEVER** use any chemicals to clean the **rear window substrate**. The top may be cleaned readily with Isopropyl Alcohol (IPA) and/or film cleaner (Fuji PS-116). Though not recommended, the rear window surface may be wiped with lintless q-tips with deionized or distilled water.
- ALWAYS** handle switches with optically bonded rigid windows with care. They should not be rolled, bent or flexed during handling or assembly. Undue flexing of the graphics and/or membrane switch could cause the rigid optically bonded window (or sections thereof) to delaminate from the flexible substrates. Handle the window areas with the same care as a tactile dome or SMT component.

**FINAL NOTE:** VIS membrane switches are engineered custom flexible circuits made from PTF using a variety of thixotropic conductive inks. Membrane switches have the advantage of low inertia, ultra low profile & long life reliability in a variety of end-use applications and environments. However, care must be taken when handling flexible circuitry in the unmounted condition. A membrane switch is, by nature, not rigid and stable until properly mounted to its final intended surface. Once permanently mounted (using the proper handling techniques described above) the membrane switch will provide rugged, reliable operation throughout its design life.



Innovative Interface

TECHNOLOGY

Drives our

Comprehensive

HMI Solutions

Customer-Focused

APPROACH Leads to

Inspired Solutions

Pursuing Perfection

in MARKETS that

Demand Higher

Complexity Solutions

Valmark Interface Solutions™

161 S. Vasco Road, Suite L  
Livermore, CA 94551

E sales@nidec-vis.com

O 925 960 9900

F 925 960 0900

W Nidec-VIS.com



Innovative Interface  
**TECHNOLOGY**  
Drives our  
Comprehensive  
HMI Solutions

Customer-Focused  
**APPROACH** Leads to  
Inspired Solutions

Pursuing Perfection  
in **MARKETS** that  
Demand Higher  
Complexity Solutions

Valmark Interface Solutions™

161 S. Vasco Road, Suite L  
Livermore, CA 94551

E sales@nidec-vis.com  
O 925 960 9900  
F 925 960 0900  
W Nidec-VIS.com



**Figure 1:** Recommended test setup. Switch tester measures: circuit continuity, closed-circuit resistance, LED polarity and function.



**Figure 2a:** Parts are tested prior to assembly. Note tactile membrane switch is laying flat in proper test fixture.



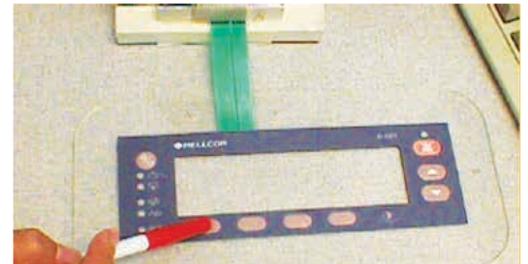
**Figure 2b:** Detail view: tactile membrane switch is laying flat in proper test fixture during test key actuation.



**Figure 3a:** NEVER actuate keys in unsupported position. Tactile membrane switches should ALWAYS be tested in flat (and supported for component clearance) position.



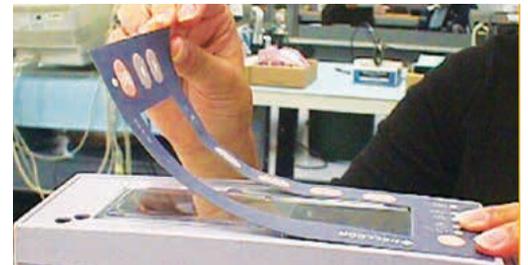
**Figure 3b:** NEVER actuate keys in unsupported position.



**Figure 4a:** NEVER actuate keys with any hard object (pen, stylus, etc.). Membrane switch keys are designed to be actuated with human finger tip.



**Figure 4b:** NEVER actuate keys with any hard object. During test or in field operation.



**Figure 5a:** NEVER roll the membrane switch onto casing or wellmount on bezel.



**Figure 5b:** NEVER roll the membrane switch onto casing or wellmount on bezel.



**Figure 6a:** NEVER burnish key or components during laminating assembly to well-mount.

Innovative Interface  
**TECHNOLOGY**  
Drives our  
Comprehensive  
HMI Solutions

Customer-Focused  
**APPROACH** Leads to  
Inspired Solutions

Pursuing Perfection  
in **MARKETS** that  
Demand Higher  
Complexity Solutions

Valmark Interface Solutions™

161 S. Vasco Road, Suite L  
Livermore, CA 94551

E sales@nidec-vis.com

O 925 960 9900

F 925 960 0900

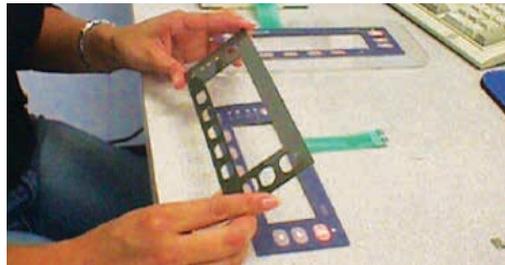
W Nidec-VIS.com



**Figure 6b:** NEVER burnish switch during assembly; it can inadvertently damage dome legs and/or SMT LEDs conductive pads.



**Figure 7a:** ALWAYS use laminating template to apply switch assembly.



**Figure 7b:** Align template over membrane switch for proper orientation.



**Figure 7c:** After threading tail through slot, PSA is exposed and placed (in flat plane, not rolled) onto well-mount on plastic case.



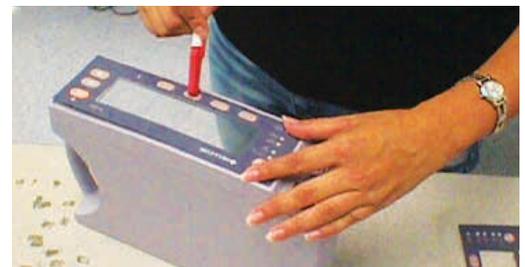
**Figure 7d:** Position template over partially laminated switch (ie., initial PSA tack, not completely laminated)



**Figure 8:** Detail side view: showing 0.040" polycarbonate template matching curve of well-mount in plastic casing.



**Figure 9:** Using template, laminate membrane switch with smooth even pressure of hand-roller (typ. 40-45 Durometer, shore A)



**Figure 10:** Even after assembled, NEVER actuate keys with hard object. Only actuate keys with human finger-tip.



**Figure 11:** Detail view: showing membrane switches stacked vertically for testing prior to assembly. Never place objects on switches in unsupported manner.



**Figure 12:** Finished part laminated to typical customer casing. Membrane switches may ONLY be laminated to substrate ONE time. VIS can not warranty parts that have been removed and/or repositioned for final assembly.