



# Nelson Nameplate

## Reference Testing: Nontactile Switch with Shorting Pad Printed on the Overlay

TECHNICAL DATA SHEET

MAY 2000

### Life Cycle Testing

#### Life Cycle Testing Data

Selected switch positions are cycled for a total of ten million (10,000,000) cycles. Actuation force and closure resistance are measured per ASTM F 1597-95 Standard Test Method for Determining the Actuation Force and Contact Force of a Membrane Switch and ASTM F 1680-96 Standard Test Method for Determining Circuit Resistance of a Membrane Switch. The condition of the graphic overlay is also measured and is recorded periodically.

#### Life Cycle Test Results

Key #1 was tested. Closure resistance remained at 10.2 +/-0.8 ohms throughout the test. The maximum actuation force varied during the test with a high of 159 grams and a low of 58 grams. The initial value and final values were 162 grams. The key showed slight ink delamination in the areas that were being flexed after approximately 250,000 cycles and continued to increase in number until 1,004,112 cycles with no significant change for the remainder of the test.

### Environmental Testing

#### Environmental Testing Procedure

Common circuits are connected together with a 35 VDC potential applied across the open contact through 18K-ohm current limiting resistors. The switches are subjected to temperature and humidity per ASTM 1596-95 Level 2 Standard Practice for Exposure of Membrane Switches to Temperature and Relative Humidity. Pretest and posttest measurements were taken of the switch travel, actuation force, contact force, circuit resistance, and the insulation resistance. Each of these measurements has a corresponding ASTM standard that was used in determining the results of the tests.

#### Environmental Test Results

Initial insulation resistance readings were all greater than  $1 \times 10^{11}$  ohms. After the ten day exposure to temperature and humidity per ASTM 1596-95 Level 2, all readings were greater than  $3.6 \times 10^{10}$  ohms. There was no silver migration. All other parameters remained virtually unchanged.

#### Construction Detail

See Construction Graphic C for construction detail.

For additional data, please contact us to discuss your potential application needs or to receive detailed test data.

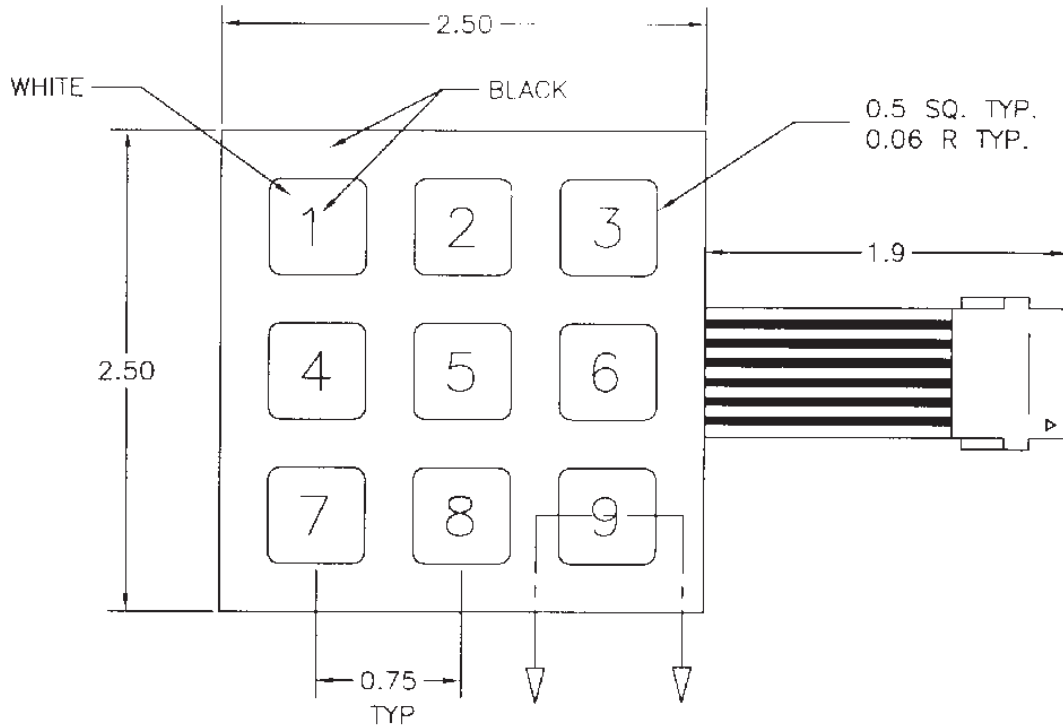
#### Nelson Nameplate Company

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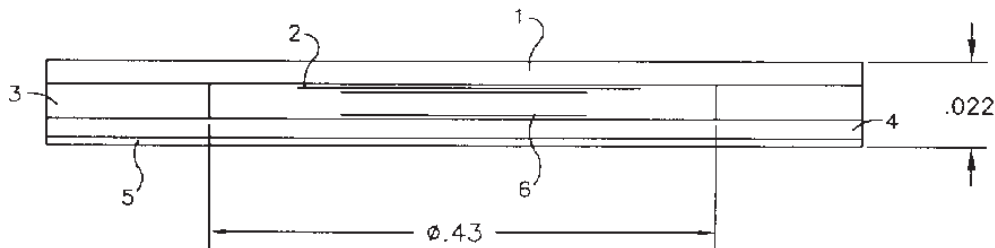
Or visit us on the Web at [www.nelsonUSA.com](http://www.nelsonUSA.com)



CIRCUIT DETAIL MODIFIER	
1	EXTERNALLY VENTED
2	CROSSOVERS
3	BIFURCATED W/ SHUNTS

1. .006 AUTOTEX 2 V6 (OVERLAY)
2. .0002 CLEAR VINYL (BARRIER INK)
3. .009 3M 7959 (SPACER)
4. .005 ICI MELINEX 561 POLYESTER (BOTTOM CIRCUIT)
5. .002 3M 7952 (ADHESIVE)
6. .0003 725A (SILVER INK)

NOTE: DEFAULT DESIGN USES  
INTERNAL VENTING, NO CROSSOVERS.



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES .XX = ±.010 .XXX = ±.005	APPROVALS	DATE	<div style="display: inline-block; vertical-align: middle; font-size: small; margin-left: 10px;">           2800 CASITAS AVENUE            LOS ANGELES, CA 90039            (323) 663-3971         </div>
	DRAWN	SHANE MAST	
TERIAL	CHECKED		TEST SAMPLE CONSTRUCTION - C - NON-TACTILE SWITCH
ISH			SIZE <b>A</b>
DO NOT SCALE DRAWING			SCALE 1=1    FILE # TESTCONS.DWG    SHEET 1 OF 1