



# Nelson Nameplate

## Reference Testing: Nontactile Two Circuit Switch

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 6.9 +/-0.1 ohms throughout the test. The maximum actuation force varied during the test with a high of 124 grams and a low of 96 grams. The initial value was 143 grams and the final was 130 grams. The key showed slight ink delamination in the areas that were being flexed after approximately 3,500,000 cycles and remained 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 A 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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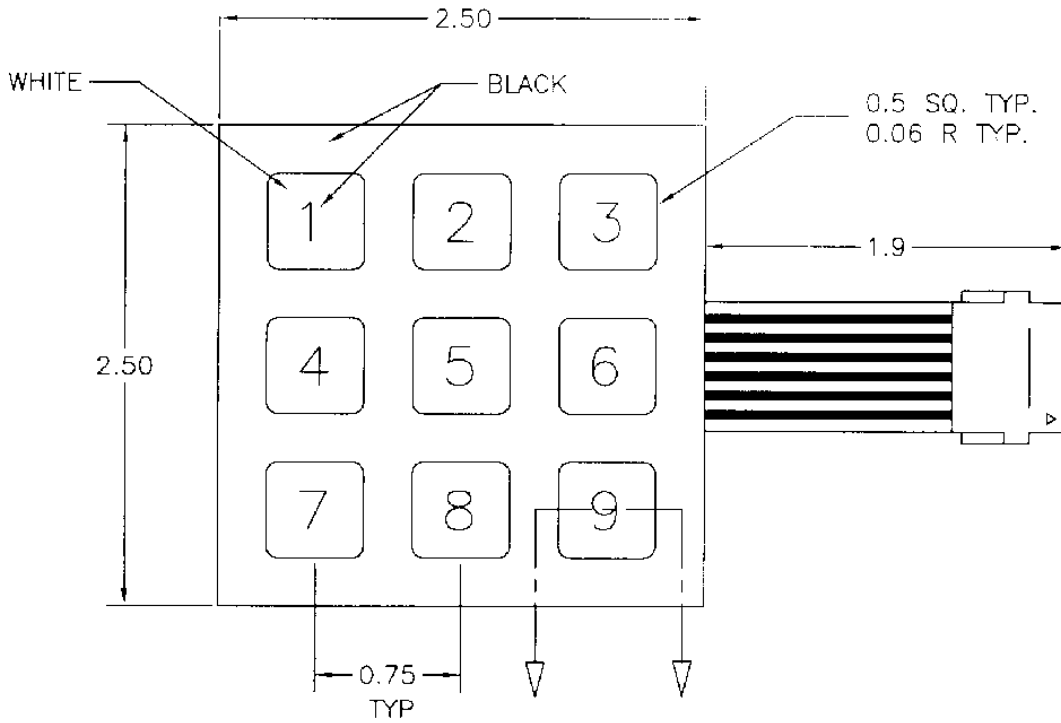
323/661-2137 Fax

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

REV.

DATE

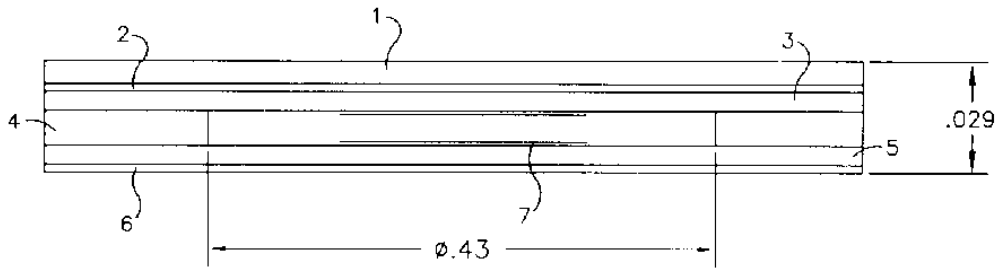
APPROVED



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

NOTE: DEFAULT DESIGN USES  
INTERNAL VENTING, NO CROSSOVERS.

1. .006 AUTOTEX 2 V6 (OVERLAY)
2. .002 3M 7952 (GRAPHICS ADHESIVE)
3. .005 ICI MELINEX 561 POLYESTER (TOP CIRCUIT)
4. .009 3M 7959 (SPACER)
5. .005 ICI MELINEX 561 POLYESTER (BOTTOM CIRCUIT)
6. .002 3M 7952 (ADHESIVE)
7. .0003 725A (SILVER INK)



UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCHES  
TOLERANCES ARE:  
FRACTIONS DECIMALS ANGLES  
.XX = ±.010  
.XXX = ±.005

APPROVALS  
DRAWN SHANE MAST  
CHECKED  
DATE 8/9/99



**Nelson  
Nameplate**

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TEST SAMPLE  
CONSTRUCTION - A -  
NON-TACTILE SWITCH

MATERIAL

FINISH

DO NOT SCALE DRAWING

SIZE  
A

SCALE 1=1

FILE #

TESTCONS.DWG

SHEET

1 OF 1