

# Switches and Tactile Domes

**Membrane Switch Specifications and Construction . . . V-2 to V-3**

**Tactile Domes . . . . . V-4**

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For more information, please see the last page of the catalog for the location nearest you or contact:

## TECHNICAL SPECIFICATIONS



# Membrane Switches: Nontactile, Tactile and Bonded Components

### Electrical

Contact Rating: 28V DC, 30mA

Life: Nontactile—5,000,000 operations minimum at maximum rated load

Tactile—1,000,000 operations minimum at maximum rated load

Termination Resistance: 100Ω max.

Contact Bounce, Nontactile: <3 milliseconds

Contact Bounce, Tactile: <10 milliseconds

Switch Capacitance: <20 picofarads (without shielding option)

### Environmental

Operating Temperature: -40 to +70°C

Humidity: Per MIL Standard 202E, Method 103B

Salt Fog: 5% solution for 48 hours

### Mechanical

Actuation Force, Nontactile: 2 oz min.

Actuation Force, Tactile: 10 to 16 oz nom., depending on dome contact style

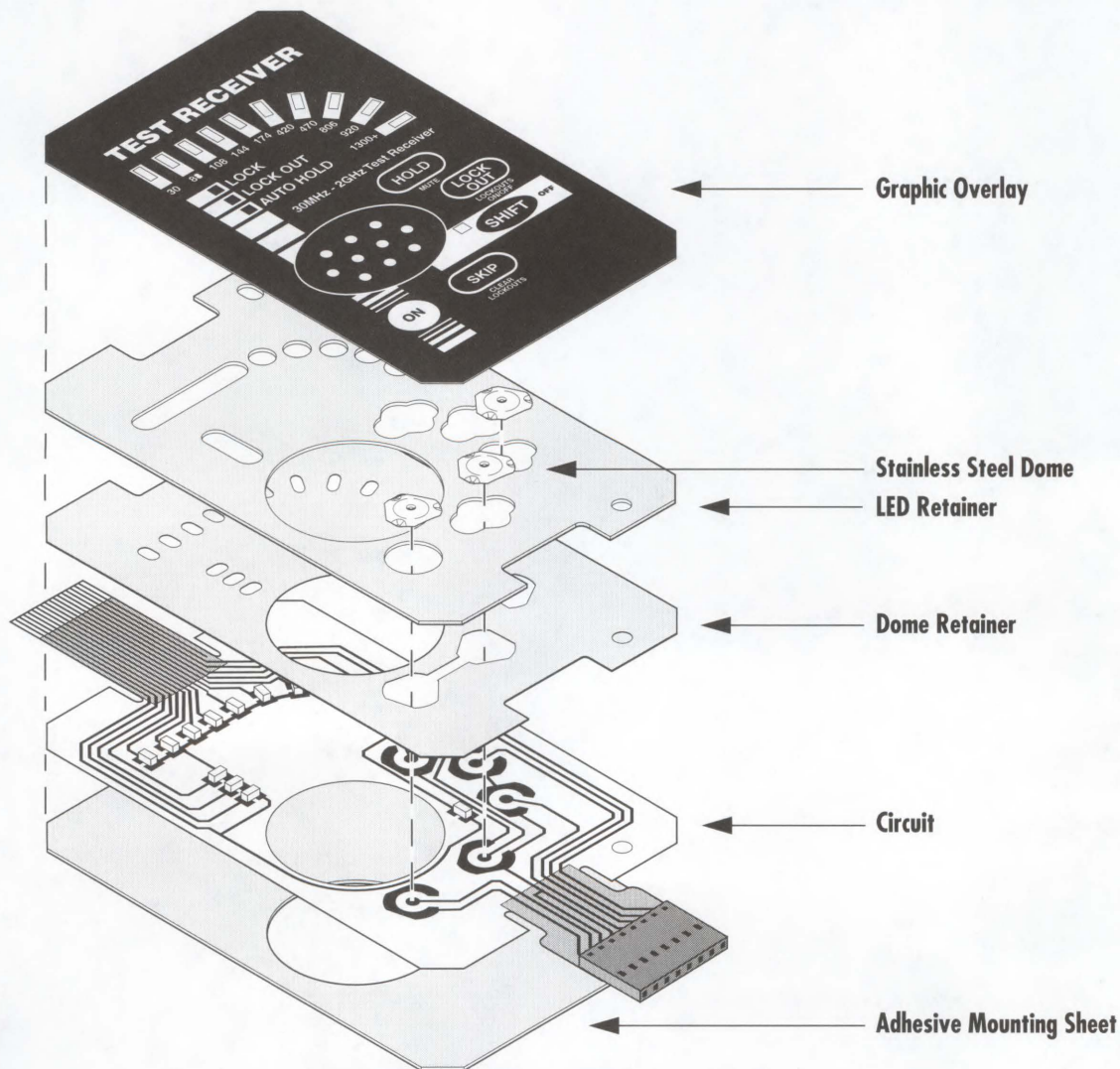
Button Travel, Nontactile: .003 to .008"

Button Travel, Tactile: .015 to .025", depending on dome contact style

Shock: 50 G. (3 hits on each axis)

Panel Thickness: .032 to .090" (typical)

## TYPICAL MEMBRANE SWITCH CONSTRUCTION



## TECHNICAL SPECIFICATIONS

### Electrical

Contact Rating: 28V DC, 30mA  
Life, Nontactile: 5,000,000 operations minimum at maximum rated load  
Life, Tactile: 1,000,000 operations minimum at maximum rated load  
Life, Silicone Rubber Design: 200,000 to 5,000,000 operations, depending on actuator design and actuation force  
Termination Resistance: 100Ω max.  
Contact Bounce, Nontactile: <3 milliseconds  
Contact Bounce, Tactile: <10 milliseconds  
Contact Bounce, Silicone Rubber: <10 milliseconds  
Switch Capacitance: <20 picofarads (without shielding option)

### Mechanical

Actuation Force, Nontactile: 2 oz min.  
Actuation Force, Tactile: 10 to 16 oz nom., depending on dome contact style  
Actuation Force, Silicone Rubber: 2 oz min., depending on actuator design  
Button Travel, Nontactile: .003 to .008"  
Button Travel, Tactile: .015 to .025", depending on dome contact style  
Button Travel, Silicone Rubber: .040" (typical)  
Shock: 50 G. (3 hits on each axis)  
Panel Thickness: Construction dependent

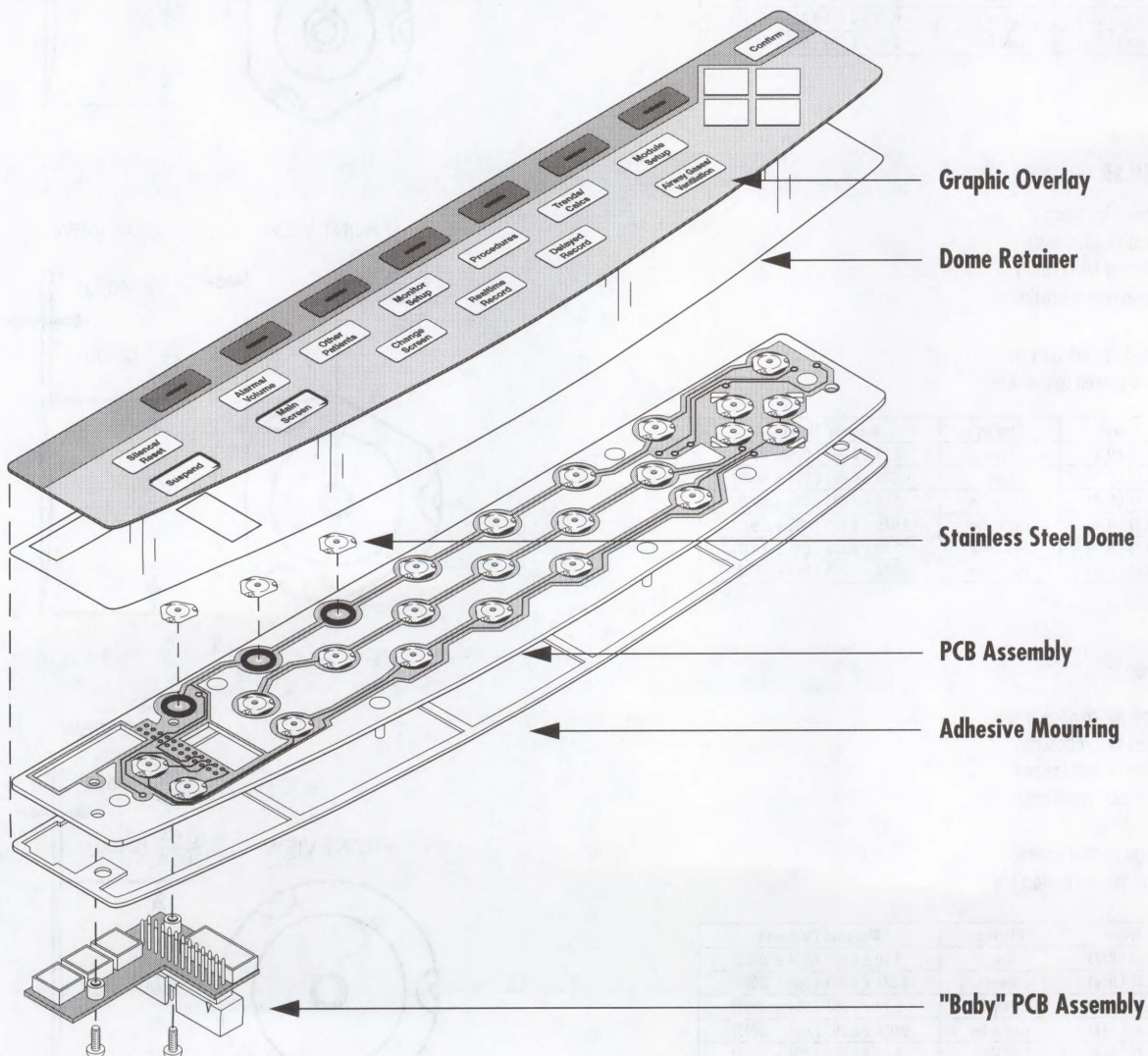
### Environmental

Operating Temperature: -40 to +70°C  
Humidity: Per MIL Standard 202E, Method 103B  
Salt Fog: 5% solution for 48 hours



## Membrane Switches: Hybrids and Control Panels

### TYPICAL HYBRID OR CONTROL PANEL CONSTRUCTION



## FEATURES AND SPECIFICATIONS

### Product Applications

- PCB contact systems
- Membrane switch tactile feedback
- Momentary switch applications
- Mechanical "snap" designs

### Physical

Material: .003"/.004" Thick Stainless Steel  
 Plating, Electro Tin: 30 to 100 $\mu$ m over Nickel  
 underplate, bright lustrous finish  
 Plating, Gold Flash: 10 $\mu$ m over Nickel flash

### Electrical

Configuration: SPST Normally Open  
 Contact Rating: 28V DC, 30mA  
 Contact Bounce: <10 milliseconds  
 Life: 1 million operations at maximum contact rating

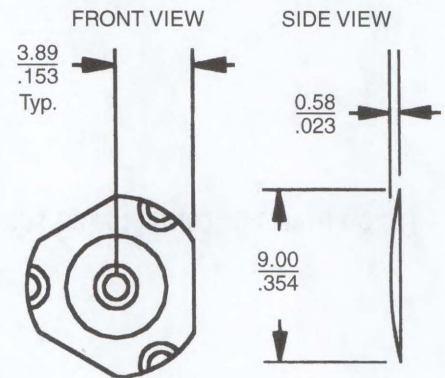
### Environmental

Operating Temperature: -40 to 105°C  
 Humidity: Per MIL-STD 202F method 103B condition A  
 Salt Fog: Per MIL-STD 202F method 101D condition B  
 Thermal Aging: 96 hours at 70°C then 96 hours at -40°C  
 Thermal Shock: Per MIL-STD 202F method 107D

## 9MM (.354") TRIANGULAR

- Small triangular shape, for close dome orientation
- Positive tactile feedback ensures switch closure
- 3 self-wiping contacts, with a center butt contact
- Reliable: retains consistent tactile characteristics throughout life
- Built for low current, low voltage contact systems
- Tin and gold plated domes have proven contact life

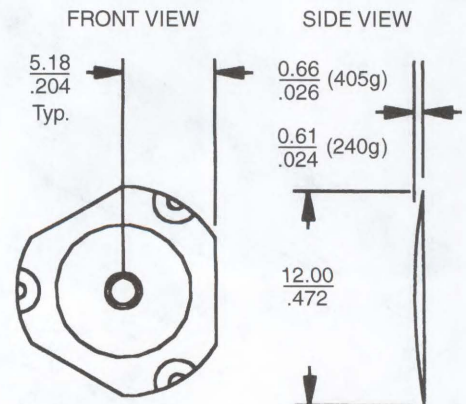
Molex Part No.	Force	Travel	Plating	Material Thickness
89-09-5002	250g	0.43 (.017)	None	0.10 ± 0.005 (.004 ± .0002)
89-09-2809	250g	0.43 (.017)	Electro-Tin	0.10 ± 0.005 (.004 ± .0002)
89-09-3593	250g	0.43 (.017)	Gold Flash	0.10 ± 0.005 (.004 ± .0002)



## 12MM (.472") TRIANGULAR

- Triangular shape, to allow dome orientation
- Positive tactile feedback ensures switch closure
- 3 self-wiping contacts, with a center butt contact
- Reliable: retains consistent tactile characteristics throughout life
- Built for low current, low voltage contact systems
- Tin and gold plated domes have proven contact life

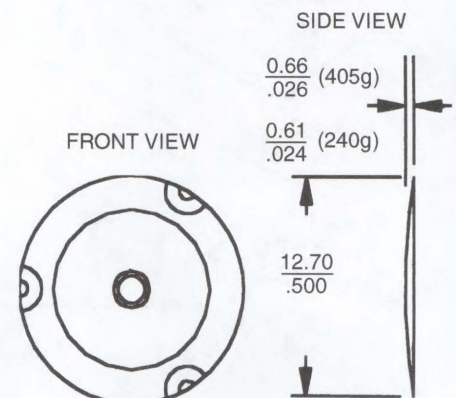
Molex Part No.	Force	Travel	Plating	Material Thickness
89-09-4995	405g	0.46 (.018)	None	0.10 ± 0.005 (.004 ± .0002)
89-09-4997	240g	0.41 (.016)	None	0.076 ± 0.005 (.003 ± .0002)
89-09-1338	405g	0.46 (.018)	Electro-Tin	0.10 ± 0.005 (.004 ± .0002)
89-09-3235	240g	0.41 (.016)	Electro-Tin	0.076 ± 0.005 (.003 ± .0002)
89-09-2650	405g	0.46 (.018)	Gold Flash	0.10 ± 0.005 (.004 ± .0002)
89-09-5000	240g	0.41 (.016)	Gold Flash	0.076 ± 0.005 (.003 ± .0002)



## 12.7MM (.500") ROUND

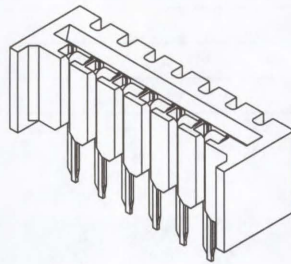
- Standard, round shape fits most switch applications
- Positive tactile feedback ensures switch closure
- 3 self-wiping contacts, with a center butt contact
- Reliable: retains consistent tactile characteristics throughout life
- Built for low current, low voltage contact systems
- Tin and gold plated domes have proven contact life

Molex Part No.	Force	Travel	Plating	Material Thickness
89-09-4989	405g	0.46 (.018)	None	0.10 ± 0.005 (.004 ± .0002)
89-09-4991	240g	0.41 (.016)	None	0.076 ± 0.005 (.003 ± .0002)
89-09-1334	405g	0.46 (.018)	Electro-Tin	0.10 ± 0.005 (.004 ± .0002)
89-09-1336	240g	0.41 (.016)	Electro-Tin	0.076 ± 0.005 (.003 ± .0002)
89-09-2287	405g	0.46 (.018)	Gold Flash	0.10 ± 0.005 (.004 ± .0002)
89-09-4993	240g	0.41 (.016)	Gold Flash	0.076 ± 0.005 (.003 ± .0002)



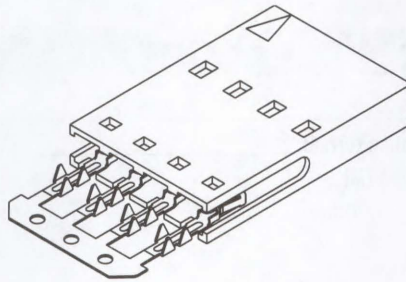
- Sizes 3 to 27 circuits
- Low insertion force
- Low profile
- Pretinned Phosphor Bronze contacts
- 94V-0 glass-filled polyester housing

**5229**



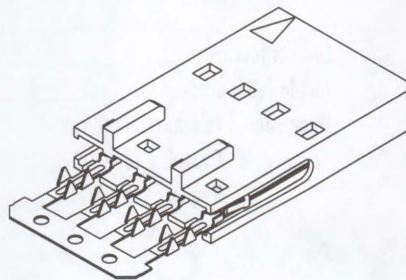
- Sizes 2 to 25 circuits
- Industry compatible
- Polarizing options available
- Locking options available
- 94V-0 polyester

**70430**



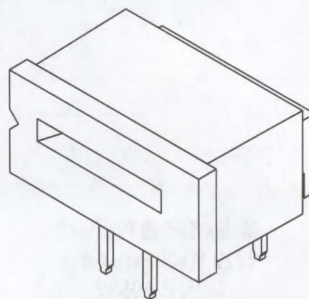
- Sizes 2 to 25 circuits
- Male pins
- Industry compatible
- Polarizing options available
- Locking options available
- 94V-0 polyester

**70431**



- Sizes 3 to 30 circuits
- Zero insertion force
- Straight or right angle PC tails
- Tin-plated Phosphor Bronze contacts
- 94V-0 polyester housing

**5597**





# Advanced Quality Planning Sheet for Membrane Switches

Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City/State: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Estimated annual usage: \_\_\_\_\_  
 Price objective: \_\_\_\_\_

Date: \_\_\_\_\_  
 Contact: \_\_\_\_\_  
 Type of control panel:  
 Membrane  Hybrid  
 Bonded Components  Tactile Membrane  
 Conductive Rubber

## GRAPHIC SHEET MATRIX

No. of colors: \_\_\_\_\_ Material: \_\_\_\_\_ Thickness: \_\_\_\_\_  
 Texture:  Matte  Gloss  Selective  
 Embossing:  Rail  Pillow  Height  
 Display windows:  LCD  LED  Vacuum

POTENTIAL CHEMICAL EXPOSURE: \_\_\_\_\_

## ELECTRICAL SPECIFICATIONS

Contact resistance (at termination): \_\_\_\_\_ Max.  
 Operating voltage: \_\_\_\_\_ Operating current: \_\_\_\_\_  
 Shielding requirements:  ESD  RFI  EMI  
 Switch circuitry:  Matrix  SPST/COM  Other  
 Max. contact bounce: \_\_\_\_\_

## MECHANICAL SPECIFICATIONS

Life requirements: \_\_\_\_\_ Cycles Panel size: \_\_\_\_\_ x \_\_\_\_\_  
 Mounting method: \_\_\_\_\_ Flex tail length: \_\_\_\_\_  
 Critical dimensions: \_\_\_\_\_  
 Termination at tail: \_\_\_\_\_ Contact force: \_\_\_\_\_  
 Optional components required: Tactile feedback: \_\_\_\_\_  
 Backlighting  LEDs  
 Conductive rubber  Backer  
 Molded housing  LCD  
 Dimensional tolerances required:  
 Overall size: +/- \_\_\_\_\_  
 Registration: +/- \_\_\_\_\_

## ENVIRONMENTAL SPECIFICATIONS

Storage Temperature: \_\_\_\_\_ min. to \_\_\_\_\_ max. Humidity: \_\_\_\_\_  
 Operating Temperature: \_\_\_\_\_ min. to \_\_\_\_\_ max. Altitude: \_\_\_\_\_  
 User environment: \_\_\_\_\_

## PRODUCT QUALIFICATION

Environment test: \_\_\_\_\_  
 Qualification process: \_\_\_\_\_

Switches and Tactile Domes

V

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 Lisle, IL 60532  
 630-969-4550

Molex recommends photocopying this form instead of removing page from catalog.