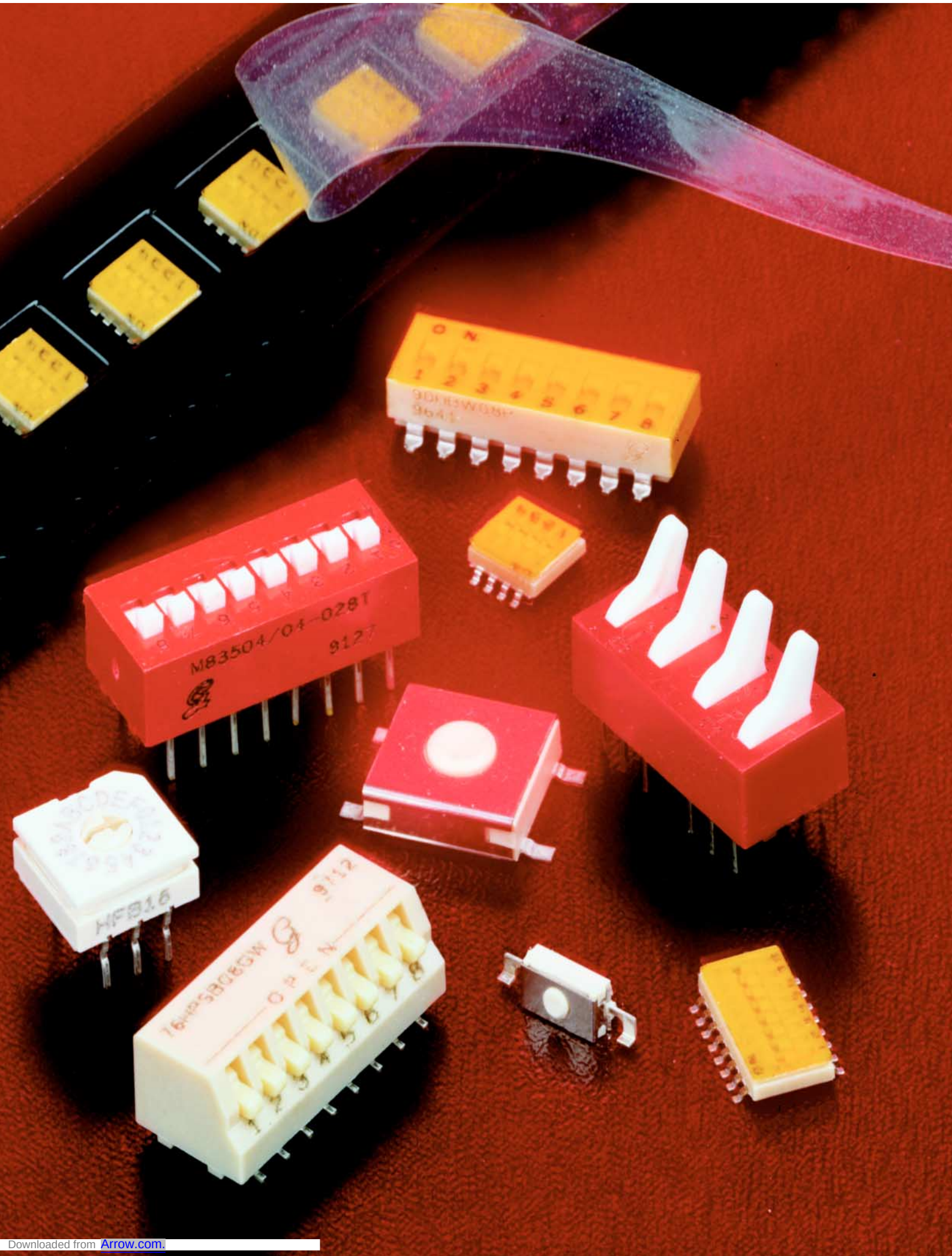

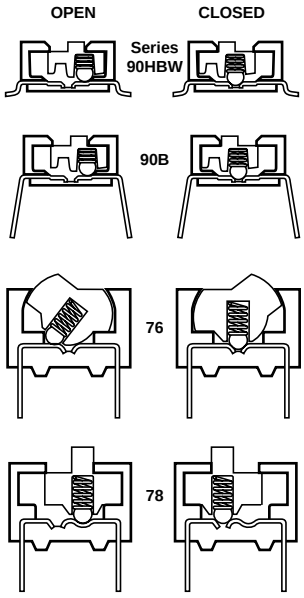


**SURFACE MOUNT SWITCHES**
- Standard DIP Package Outline Includes PIANO-DIP®
- Tactile Feedback, Board Mount Switches

**THRU-HOLE DIP SWITCHES**
- Consistent High Contact Pressure With Spring and Ball Contact System
- Standard Base Seal; Optional Top Tape Seal
- Large Selection of Types and Styles Includes Military Qualified Switches

Page

**SELECTION CHART** ..... B-3

**SURFACE MOUNT SWITCHES**

| | | |
|---|---|---|
| Half-Pitch | Series 97 | B-4 |
| Tactile | Series 95 | B-5 |
| SPST, Low Profile | Series 90HB | B-7 |
| SPDT and DPST | Series 78H | B-9 |
| Side Actuated PIANO-DIP® | Series 76HP | B-10 |

**THRU-HOLE DIP SWITCHES**

| | | |
|---|---|---|
| Machine Insertable MIDIP® | Series 90B | B-11 |
| SPST Rocker | Series 76 | B-12 |
| SPST to 4PST Slide | Series 78 | B-13 |
| SPDT | Series 76 & 78 | B-14 |
| DPDT | Series 76 & 78 | B-15 |
| Specifications | Series 76, 78, 90B | B-16 |
| Military Qualified | M83504 | B-17 |
| Linear Action Tap | Series 79A & 79C | B-18 |
| Right Angle Terminal Option | | B-20 |
| Options and Accessories | | B-21 |

**ROTARY DIP SWITCHES**

| | | |
|---|---|---|
| Binary Coded | Series 94H | B-22 |
| Economical Binary Coded | Series 94R | B-23 |

## SURFACE MOUNT SWITCHES

| Circuitry | Description | Type of Actuation | Series | No. of Positions Available | No. of Actuators | Page Number |
|---|---|---|---|---|---|---|
| Single Pole, Single Throw | Half-Pitch | Top Actuated, Recessed Slide | 97 | 4, 6 & 8 | 1/Station | B-4 |
| | Tactile | Snap Dome | 95 | 1 | 1 | B-5 |
| | Standard DIP Package | Top Actuated, Recessed Slide | 90 | 2-10 | 1/Station | B-7 |
| | Standard DIP Package | Side Actuated | 76 | 2-10 & 12 | 1/Station | B-10 |
| SPDT, DPST | Standard DIP Package | Side Actuated, Top Actuated | 78 | 2-10 | 1/Station | B-9 |
| Standard, Complement Code | Octal, BCD & Hex | Rotary | 94 | 8, 10 & 16 | 1 | B-22 |

## THRU-HOLE DIP SWITCHES

**(Also see Series 76, 78 and 90 Surface Mount DIP Switches)**

| Circuitry | Description | Type of Actuation | Series | No. of Positions Available | No. of Actuators | Page Number |
|---|---|---|---|---|---|---|
| **SINGLE THROW SWITCHES** | | | | | | |
| Single Pole, Single Throw | Machine Insertable | Recessed Slide | 90 | 2–10 | 1/Station | B-11 |
| | Standard | Raised Rocker | 76 | 2-10 & 12 | 1/Station | B-12 |
| | | Recessed Rocker | 76 | 2-10 & 12 | 1/Station | B-12 |
| | | Side Actuated | 76 | 2–10 & 12 | 1/Station | B-12 |
| | | Slide* | 78 | 2–10 & 12 | 1/Station | B-13 |
| | | Recessed Slide* | 78 | 2–10 | 1/Station | B-13 |
| | Military Qualified | Raised Rocker (MS83504/01) | 76 | 2-10 & 12 | 1/Station | B-17 |
| | | Recessed Rocker (MS83504/02) | 76 | 2-10 & 12 | 1/Station | B-17 |
| | | Side Actuated (MS83504/11) | 76 | 2–10 & 12 | 1/Station | B-17 |
| | | Slide (MS83504/04) | 78 | 2–10 & 12 | 1/Station | B-17 |
| | | Machine Insertable (MS83504/12) | 90 | 2-10 | 1/Station | B-17 |
| Multiple Pole, Single Throw | 2PST | Slide* | 78 | 1–5 | 1/Station | B-13 |
| | 3PST | Slide* | 78 | 1–3 | 1/Station | B-13 |
| | 4PST | Slide* | 78 | 1 & 2 | 1/Station | B-13 |
| | 5, 6, 7, 8, or 10PST | Slide* | 78 | 1 | 1/Station | B-13 |
| **MULTIPLE THROW SWITCHES** | | | | | | |
| Circuit Selector | 1-of-10 Circuits | Linear Action Slide | 79 | 10 | 1 | B-21 |
| | 1-of-16 Circuits | Linear Action Slide | 79 | 16 | 1 | B-21 |
| Single Pole, Multiple Throw | Standard | Raised Rocker | 76 | 2–4 | 1/Station | B-14 |
| | | Recessed Rocker | 76 | 2–4 | 1/Station | B-14 |
| | | Toggle | 76 | 2–4 | 1/Station | B-14 |
| | | Slide* | 78 | 1–6 | 1/Station | B-14 |
| | Military Qualified | Raised Rocker (MS38504/05) | 76 | 2–4 | 1/Station | B-17 |
| | | Recessed Rocker (MS38504/06) | 76 | 2–4 | 1/Station | B-17 |
| Double Pole, Double Throw | Standard | Raised Rocker | 76 | 1 & 2 | 1/Station | B-15 |
| | | Recessed Rocker | 76 | 1 & 2 | 1/Station | B-15 |
| | | Toggle | 76 | 1 & 2 | 1/Station | B-15 |
| | | Slide* | 78 | 1 & 2 | 1/Station | B-15 |
| **BINARY CODED OUTPUT SWITCHES** | | | | | | |
| Standard Code | BCD & Hexadecimal | Linear Action Slide | 79 | 10 & 16 | 1 | B-18 |
| | Octal, BCD, & Hex | Rotary | 94 | 8, 10 & 16 | 1 | B-22 |
| Complement | Octal, BCD, & Hex | Rotary | 94 | 8, 10 & 16 | 1 | B-22 |

*Switch is also available with right angle termination. See page listed above and page B-20.

Grayhill Series 76 DIP switches are covered by one or more of the following patents pending: 4,031,345, Canada 1,035,820 (1978), and Canada 1,055,551 (1979). Series 79 switches are protected by patent number 4,491,703. Series 90 switches are protected by patent numbers 4,590,344 and 4,670,630.


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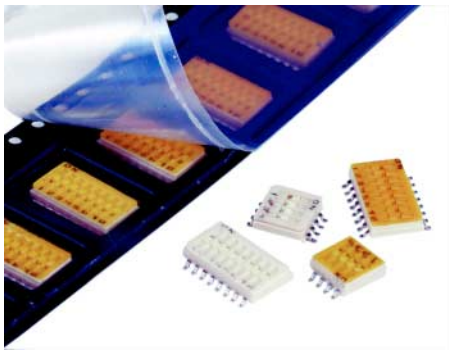
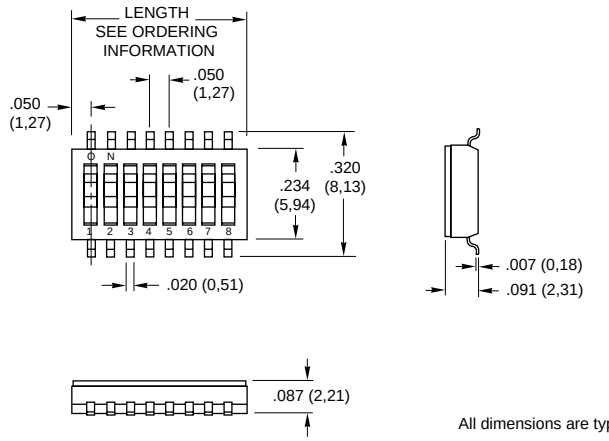
# SERIES 97
## Half-Pitch

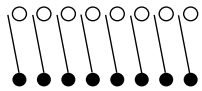
## FEATURES
- Requires One-Half the Board Space of a Standard DIP Switch
- Assembly Process Compatible to 260°C
- Available in 4 and 8 Position Lengths
- Tape and Reel Packaging for Surface Mount Assembly



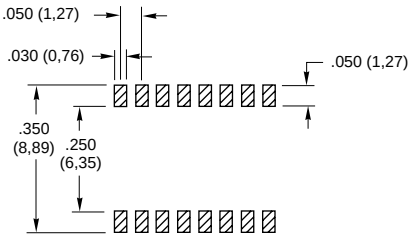
## DIMENSIONS In inches (and millimeters)




**Circuitry**



**Recommended PC Pad Dimensions**




## SPECIFICATIONS

### Electrical Ratings
**Contact Rating:** 100 mA at 50 Vdc non-switching; 25 mA at 24 Vdc, 10 mA at 50 Vdc switching.
**Contact Resistance:** 100 mohms maximum initially (measured at 10 mA, 50 mVdc). 150 mohms maximum after life.
**Insulation Resistance:** Minimum at 100 Vdc between adjacent closed contacts and also across open switch contacts.
Initial: 1,000 Mohms After Life: 200 Mohms
**Dielectric Strength:** 300 Vac RMS, minimum voltage measured between adjacent closed contacts and also across open switch contacts.
**Switch Capacitance:** 5 pF at 1 megahertz

### Mechanical Ratings
**Mechanical Life:** 1,000 cycles minimum
**Vibration Resistance:** Per MIL-STD-202, Method 204, Test Condition A: There shall be no opening of closed contacts or closing of open contacts in excess of 10 microseconds, and there shall be no evidence of broken, loose, deformed or displaced parts.
**Mechanical Shock:** Per MIL-STD-202, Method 213, Test Condition E: There shall be no opening of closed contacts or closing of open contacts in excess of 10 microseconds, and there shall be no evidence of broken, loose, deformed or displaced parts.
**Thermal Shock Resistance:** Per MIL-STD-202, Method 107G, there shall be no evidence of physical damage or permanent change in electrical characteristics.
**Terminal Strength:** Per MIL-STD-202, Method 211A, Test Condition A. There shall be no evidence of mechanical distortion, cracking of the switch body or changes in the electrical characteristics.
**Thermal Aging:** Per MIL-STD-202, Method 108A. 1000 hours at 125°C.

### Environmental Ratings
**Operating Temperature:** -40°C to +85°C
**Storage Temperature Range:** -55°C to +85°C
**Moisture Resistance:** Per MIL-STD-202, Method 106, there shall be no evidence of corrosion and the insulation resistance shall be no less than 10 Mohms.

### Soldering Information
**Recommended Processing Temperature:** 220°C–230°C (1 pass—260°C maximum)
**Resistance to Soldering Heat:** Reflow or infrared soldering, 260°C for 60 seconds.
**Flux Cleaning:** Sealed switches withstand aqueous, detergent and isopropyl alcohol washing.

### Materials and Finishes
**Non-Conductive Parts:** Cover, slide and base are a natural colored thermoplastic. **(**UL94V-O)
**Shorting Member:** Copper alloy,plated. 10 microinches minimum gold over nickel.
**Base Contacts:** Brass, plated. 10 microinches minimum gold over nickel.
**Terminals:** Brass, solder-plated, solderable per MIL-STD-202, Method 208.

### Tape and Reel Packaging
Switches will be supplied on 13 inch reels with 2000 switches per reel. The 4 position switches have a tape width of 16mm, while the 8 position switches have a tape width of 24mm. The tape pockets have a 12mm pitch.

**Available from your local Grayhill Distributor.** For prices and discounts, contact a local Sales office, an authorized local Distributor or Grayhill.

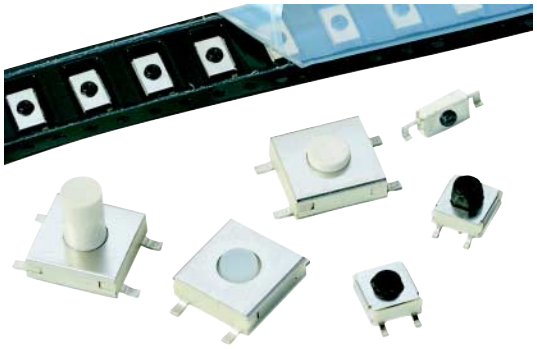
## ORDERING INFORMATION* (2000 switches per reel)

| No. of Positions | Length Inches (mm) | Part Number Without Tape Seal | Part Number With Tape Seal |
|---|---|---|---|
| 4 | 0.250 (6,35) | **97S04R** | **97S04SR** |
| 8 | 0.450 (11,43) | **97S08R** | **97S08SR** |

* Consult Grayhill for 2 and 6 position switches.

# SERIES 95
## Tactile

### FEATURES
- Excellent Tactile Feedback
- Compatible with SMT Assembly Including Infrared and Vapor Phase



## DIMENSIONS In inches (and millimeters)

### 6.9 mm x 3.5 mm Flush Mount Right Angle
### 95B04 Style

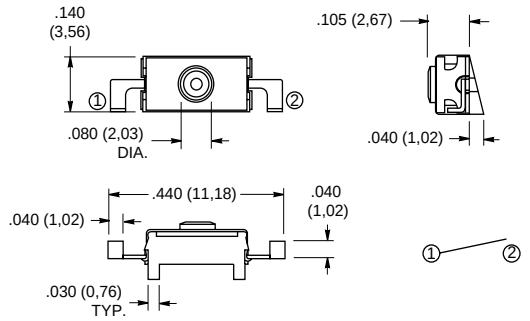



Figure 1

### 6.0 mm x 6.0 mm Gull Wing
### 95B06 Style

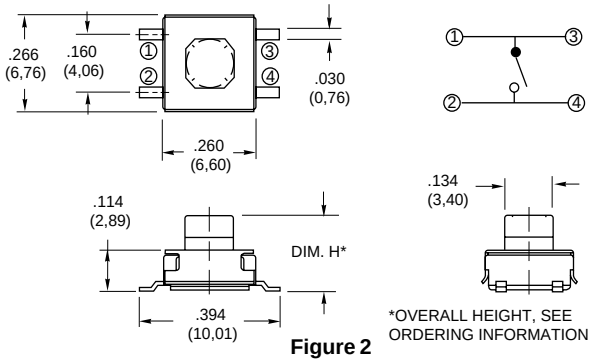



Figure 2

### 11.5 mm x 11.5 mm Gull Wing
### 95B12 Style

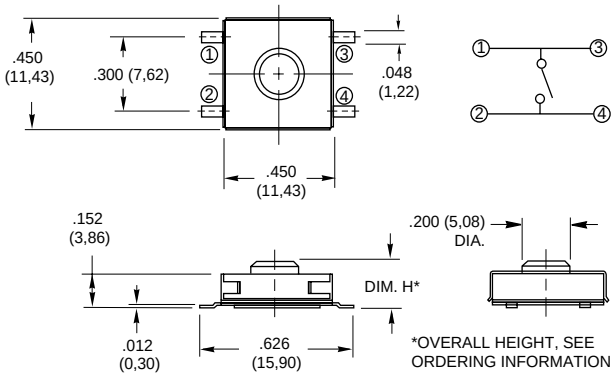
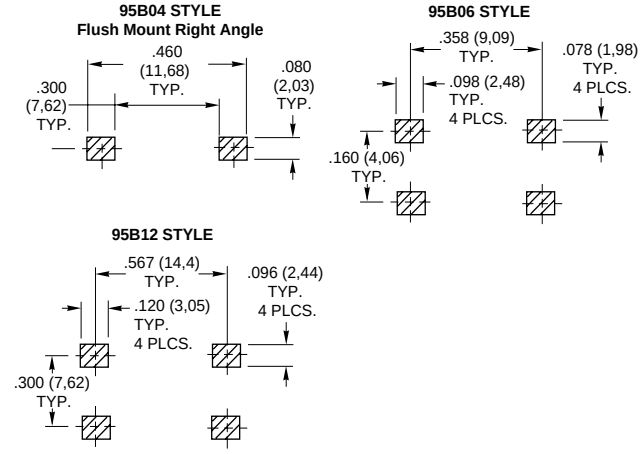



Figure 3

### Recommended Solder Pad Layout





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## SPECIFICATIONS

### Electrical Ratings

**Maximum Power:** .5 VA
**Maximum Voltage:** 50 volts
**Maximum Current:** 100 mA
**Insulation Resistance:** 5000 mohms after life
**Dielectric Strength:** ≤ 50 mohms initial, ≤ 100 mohms after life
**Contact Resistance:** 50 mohms maximum initially (measured at 10 mA, 50 mVdc). 100 mohms maximum after life.
**Contact Bounce:** less than 10 mS
**Contact System:**
B04/B12: Silver on silver;
B06: Silver on palladium

### Mechanical Ratings

**Actuation Force:** See Ordering Information; dependent on switch style
**Mechanical Life:** See Ordering Information; dependent on switch style
**Button Travel:** See Ordering Information; dependent on switch style
**Terminal Strength:** 5 cycle bends per MIL-STD-202F, Method 211
**Vibration Resistance:** Pass 10-2000 Hz at 15G, or a 0.060 inch double amplitude test per MIL-STD 204, Condition B.
**Mechanical Shock:** Pass 50G, 11 mS, half-sine test per MIL-STD 213B, Condition A.
**Thermal Shock Resistance:** Pass MIL-STD-202F, Method 107G showing no evidence of physical damage or change in electrical characteristics including normal contact resistance after 5 operations.
**Thermal Aging:** Pass MIL-STD-202F, Method 108A, Test Condition D. Requires operation at 125°C for 1,000 hours. Measurements at 500 and 1,000 hours of exposure showing no more than 50% change in contact resistance for test duration.

### Environmental Ratings

**Operating Temperature Range:** -40°C to +85°C
**Storage Temperature Range:** -40°C to +85°C
**Moisture Resistance:** Pass MIL-STD-202F, Method 106 showing no evidence of corrosion and insulation resistance greater than 10 Mohms, 1,000 Mohms at 250 Vac after drying period.
**Flammability:** Test to IEC Standard 695-2-2 for 30 seconds of exposure
**Environmental Life:** 50 mohms maximum contact resistance after exposure to a Battelle Class III test per EIA 364, TP 65 (B04 tested only).

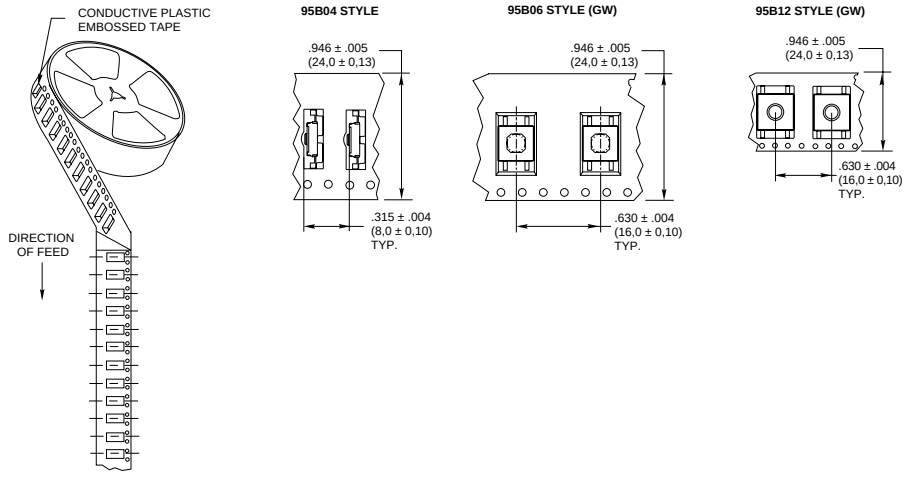
### Soldering Information

**Soldering Temperature:** Infrared or Vapor Phase with 260°C maximum temperature for 95B06 and 95B12 styles, 230° maximum temperature for 95B04 styles.
**Cleaning:** sealed to withstand cleaning processes.

### Tape and Reel Packaging

Standard Tape and Reel Packaging per EIA-481-2
Switches per reel: See Ordering Information

## TAPE AND REEL PACKAGING




Meets requirements of EIA 481-2 or EIA 481-3

Each reel has a 15.35 inch (390 mm) minimum leader and a 6.30 inch (160 mm) minimum trailer.

## ORDERING INFORMATION

| Description | Figure | Actuator Type | Overall Height | Actuation Force | Life (Cycles) | Switches/ Reel | Switch Part Number |
|---|---|---|---|---|---|---|---|
| Flush Mount Right Angle | 1 | Standard | .105" | 240± 60g | 25,000 | 2000 | 95B04A2RAR |
| Perpendicular mnt. w/gull wing terminals | 2 | Standard | .213" | 140 ± 50g | 500,000 | 1000 | **95B06C1GWR** |
| Perpendicular mnt. w/gull wing terminals | 2 | Standard | .213" | 275 ± 60g | 100,000 | 1000 | **95B06C3GWR** |
| Perpendicular mnt. w/gull wing terminals | 2 | Soft/rubber | .159" | 140 ± 50g | 500,000 | 1000 | **95S06A1GWR** |
| Perpendicular mnt. w/gull wing terminals | 2 | Soft/rubber | .159" | 275 ± 60g | 100,000 | 1000 | **95S06A3GWR** |
| Perpendicular mnt. w/gull wing terminals | 3 | Standard | .172" | 300 ± 75g | 1,000,000 | 750 | **95B12A3GWR** |
| Perpendicular mnt. w/gull wing terminals | 3 | Standard | .205" | 300 ± 75g | 1,000,000 | 750 | **95B12B3GWR** |
| Perpendicular mnt. w/gull wing terminals | 3 | Standard | .445" | 300 ± 75g | 1,000,000 | 750 | **95B12C3GWR** |

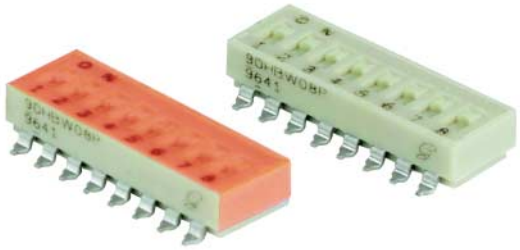
**Available from your local Grayhill Distributor.**
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

# SERIES 90HB

## SPST, Low Profile

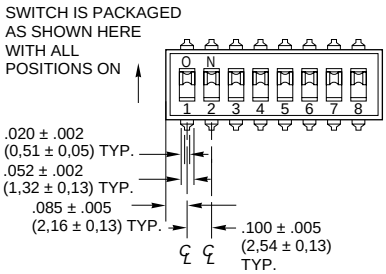
### FEATURES

- Now Available with Polyimide Tape Seal that Easily Removes After Processing
- Compatible with SMT Assembly, Including Infrared Reflow and Vapor-Phase
- Top Seal Withstands High Pressure Aqueous Cleaning
- Reliable Spring and Ball Contact

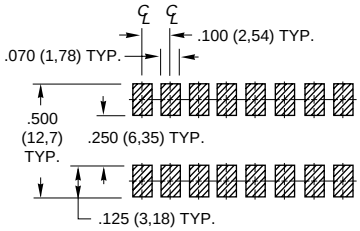


### DIMENSIONS In inches (and millimeters)

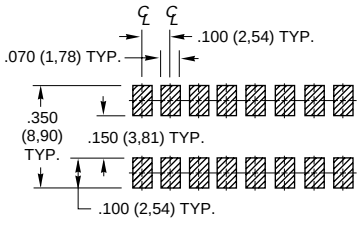
**Top View–Gull Wing**



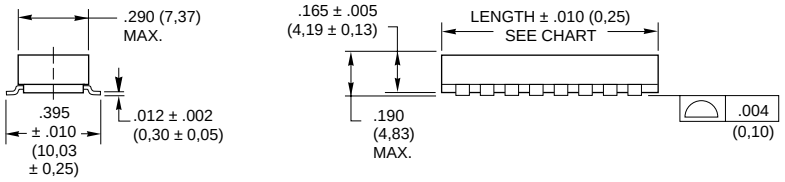

**Recommended PC Pad Dimensions–Gull Wing**



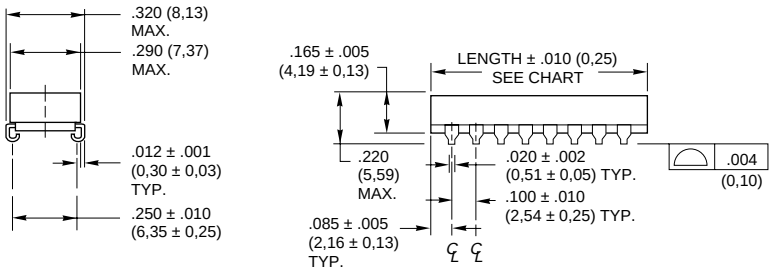

**Recommended PC Pad Dimensions–J-Bend**




**Gull Wing**

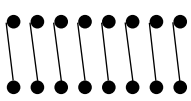



**J-Bend**




### CIRCUITRY

As viewed from the top of the switch in the positions shown in the drawing.

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# SPECIFICATIONS

## Electrical Ratings

**Make-and-break Current Rating:** 2,000 operations per switch position at these resistive loads:10 mA, 30 Vdc; or 10 mA, 50 mVdc; 10 mA, 50 mVdc; or 25 mA, 24 Vdc; or 100 mA,6 Vdc.
**Contact Resistance:** (measured at 10 mA, 50 mVdc). Initial: 20 mohms maximum, After Life: 100 mohms maximum
**Insulation Resistance:** Minimum, at 100 Vdc between adjacent closed contacts and also across open switch contacts.
Initial (Mohms): 5,000, After Life (Mohms): 1,000
**Dielectric Strength:** Minimum voltage (AC RMS) measured between adjacent closed contacts and also across open switch contacts.
Initial: 500 volts, After Life: 500 volts
**Current Carry Rating:** 3A maximum rise of 20°C
**Switch Capacitance:** 2 pF at 1 megahertz

## Mechanical Ratings

Where Grayhill performance is superior, the MIL spec is listed in parentheses.
**Mechanical Life:** 5,000 operations per switch position
**Vibration Resistance:** Per Method 204, Test Condition B , 1mS opening (10 mS allowed)
**Mechanical Shock:** Per Method 213, Test Condition A. 1mS opening (10 mS allowed)
**Thermal Shock Resistance:** Per specification; no failures; passes contact resistance.
**Terminal Strength:** Per specification
**Thermal Aging:** 1,000 hours at 85°C; no failures.

## Environmental Ratings

Meets all requirements of MIL- S-83504.
**Operating Temperature Range:** -40°C to + 85°C
**Storage Temperature Range:** -40°C to + 85°C
**Moisture Resistance:** Per specification, Method 106.

## Soldering Information

**Solderability:** Per MIL-STD-202, Method 208
**Soldering Heat Resistance:** Per MIL-S-83504, six second test.
**Recommended Processing Temperature:** 220°C–230°C (1 pass—260°C maximum)
**Processing Position:** Switch is to be processed with all actuators in the closed (on) position as shipped.
**Fluxing:** Per EIA RS-448-2 with flux touching switch body.
**Cleaning:** Passes immersion test using water/ detergent. Acceptable solutions include 1-1-1 trichlorethane, freon, (TF, TE, or TMS), isopropyl alcohol, detergent (140°F maximum). Terpene acceptable for Series 90 only. Solutions which are not recommended include acetone, methylene chloride, freon TMC.

## Materials and Finishes

**Shorting Member (Ball):** Brass, gold-plated 10 microinches minimum over nickel barrier.
**Base Contacts:** Copper alloy, gold-plated 10 microinches minimum over nickel barrier.
**Terminals:** Copper alloy, solder-plated over nickel barrier.
**Non-Conductive Parts:** Thermoplastic (UL94V-O)

## Tape and Reel Packaging

**Tape Seal Integrity:** Passes gross leak test using 125°C flourinert for 20 seconds minimum. Reference MIL-STD-202, Method 112
**Tape Seal:** Polyimide film

# ORDERING INFORMATION

**90HBW02PR**

**Series**
**Terminal Style:** W = Gull Wing, J = J-Bend

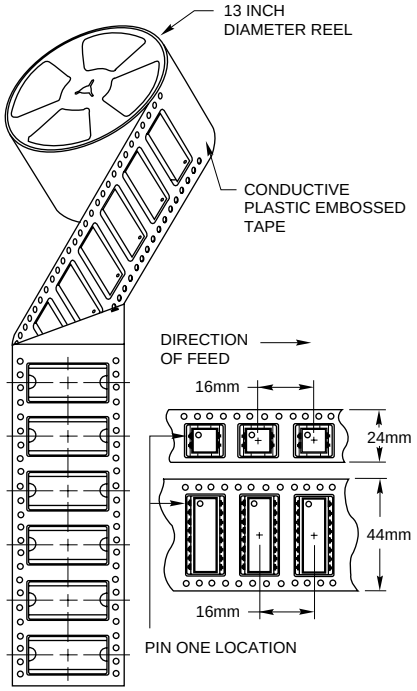
**Packaging:** R = Tape and reel packaging (750 switches/reel)
Blank = Tube packaging (each tube is 19.5" long)
**Seal:** P = Polyimide Seal
Blank = No Seal
**Number of Positions:** 02 through 10

| No. of Pos. | Length Inches | Length Metric | No. of Pos. | Length Inches | Length Metric |
|---|---|---|---|---|---|
| 2 | .270" | 6,9 mm | 7 | .770" | 19,56 mm |
| 3 | .370" | 9,4 mm | 8 | .870" | 22,1 mm |
| 4 | .470" | 11,9 mm | 9 | .970" | 24,64 mm |
| 5 | .570" | 14,48 mm | 10 | 1.070" | 27,2 mm |
| 6 | .670" | 17,0 mm | | | |

**Available from your local Grayhill Distributor.** For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

# TAPE AND REEL PACKAGING

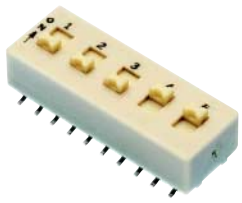
Meets requirements of
EIA 481-2 or EIA 481-3




Each reel has a 15.750 inch (390 mm) minimum leader and a 6.30 inch (160 mm) minimum trailer.

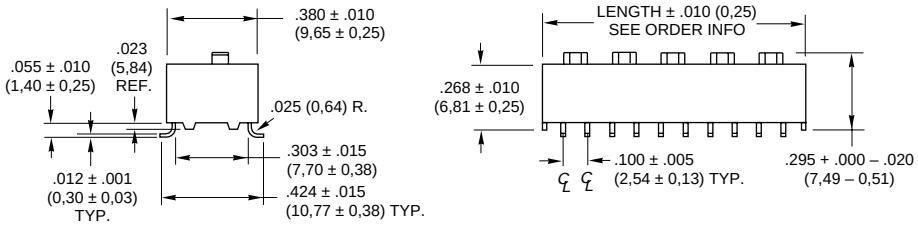
# SERIES 78H
## SPDT and DPST

## FEATURES
- Compatible with SMT Assembly Including Infrared Reflow and Vapor-Phase
- Circuitry not Offered in any Other Surface Mount Configuration
- Reliable Spring and Ball Contact

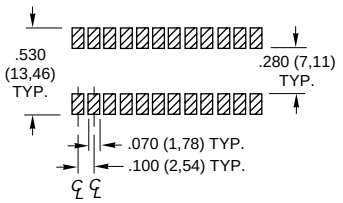


## DIMENSIONS In inches (and millimeters)

**SPDT, DPST, Top Actuated, Slide Operated**

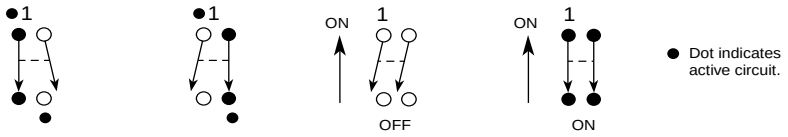



**Recommended PC Pad Dimensions**




## CIRCUITRY

**SPDT** 2 Circuits (no common) **DPST**




## SPECIFICATIONS

### Electrical Ratings

**Make-and-break Current Rating:** 10,000 operations per switch position at 1 mA, 5 Vdc; 50 mA, 30 Vdc; or 150 mA, 30 Vdc
**Contact Resistance:** Initial: 30 mohms max. After Life: 100 mohms max. (10 mA at 50 Vdc, open circuit)
**Insulation Resistance:** Minimum, at 100 Vdc between adjacent closed contacts and also across open switch contacts. Initial: 2,000 Mohms; After Life: 1,000 Mohms
**Dielectric Strength:** Minimum voltage (AC, RMS) measured between adjacent closed contacts and also across open switch contacts. Initial: 750 volts; After Life: 500 volts
**Current Carry Rating:** 4 amps, maximum rise of 20°C
**Switch Capacitance:** 2 pF at 1megahertz

### Mechanical Ratings

**Mechanical Life:** 20,000 operations per switch position
**Vibration Resistance:** Per method 204, Test Condition B. 1 mS opening (10 mS allowed)
**Mechanical Shock:** Per Method 213, Test Condition A. 1 mS opening (10 mS allowed)
**Terminal Strength:** Per specification
**Thermal Aging:** 1,000 hours at 85°C; no failures
**Thermal Shock:** Per specification; no failures; passes contact resistance

### Environmental Ratings

Meets all requirements of MIL- S-83504. Where Grayhill performance is superior, the MIL spec is listed in parentheses.
**Operating Temperature Range:** -40°C to + 85°C
**Storage Temperature Range:** -55°C to + 85°C
**Moisture Resistance:** Per specification, Method 106

### Soldering Information

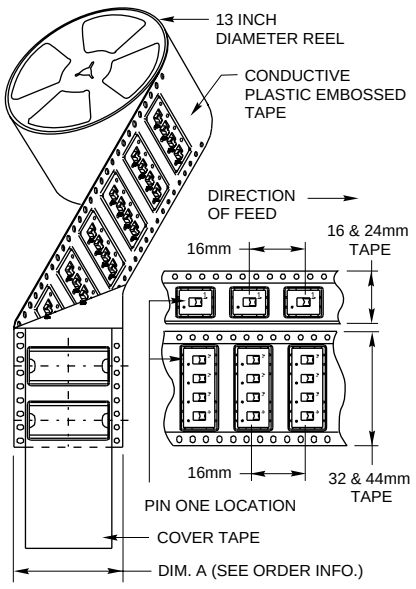
**Solderability:** Per MIL-STD-202, Method 208
**Soldering Heat Resistance:** Per MIL-S-83504, six second test
**Recommended Processing Temperature:** 220°C–230°C (1 pass—260°C maximum)
**Processing Position:** Switch is to be processed with all actuators in the closed (on) position as shipped.

### Materials and Finishes

**Shorting Member:** Brass, gold-plated, 10 microinches minimum over nickel barrier.
**Base Contacts:** Copper alloy, gold-plated, 10 microinches minimum over nickel barrier.
**Terminals:** Copper alloy, solder-plated over nickel barrier.
**Non-Conductive Parts:** Cover is natural color thermoplastic, actuators are white thermoplastic (UL94V-O)

## TAPE AND REEL PACKAGING

Meets requirements of EIA 481-2 or EIA 481-3




Each reel has a 15.750 inch (390 mm) minimum leader and a 6.30 inch (160 mm) minimum trailer.

## ORDERING INFORMATION: Tube Packaging

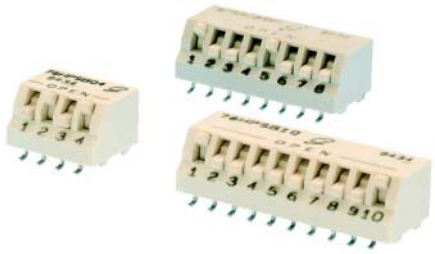
| No. of Positions | Length (inches) | Length (metric) | Carrier Width Dim. A | Part Number* SPDT | Part Number* DPST |
|---|---|---|---|---|---|
| 1 | 0.280" | 7,1 mm | 24 mm | **78HJ01GW** | **78HF01GW** |
| 2 | 0.480" | 12,2 mm | 24 mm | **78HJ02GW** | **78HF02GW** |
| 3 | 0.680" | 17,3 mm | 32 mm | **78HJ03GW** | **78HF02GW** |
| 4 | 0.880" | 22,4 mm | 44 mm | **78HJ04GW** | **78HF04GW** |
| 5 | 1.080" | 27,4 mm | 44 mm | **78HJ05GW** | **78HF05GW** |

* Add "R" to the Grayhill part number for tape and reel packaging (500 switches/reel).

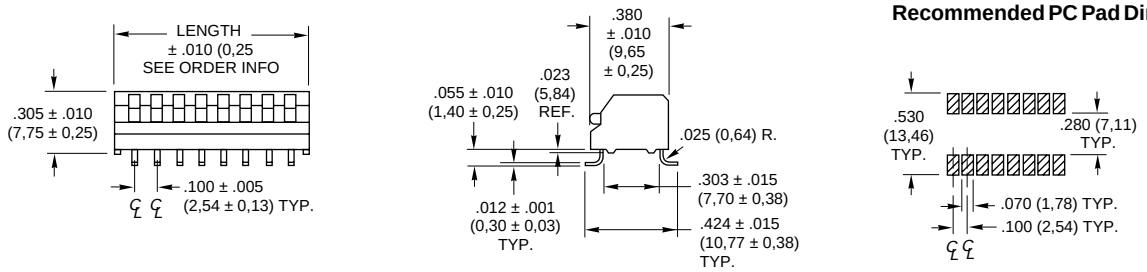
**Available from your local Grayhill Distributor.** For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

# SERIES 76HP
## Side Actuated PIANO-DIP®

## FEATURES
- Compatible with SMT Assembly Including Infrared Reflow and Vapor-Phase
- Easily Accessed when PC Boards are Racked
- Reliable Spring and Ball Contact

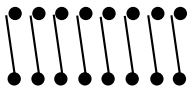


## DIMENSIONS In inches (and millimeters)




## CIRCUITRY

As viewed from the top of the switch in the positions shown in the drawing.



## SPECIFICATIONS

### Electrical Ratings
**Make-and-break Current Rating:** 10,000 operations per switch position at 1 mA, 5 Vdc; 50 mA, 30 Vdc; or 150 mA, 30 Vdc
**Contact Resistance:** Initial: 30 mohms maximum; After Life: 100 mohms maximum (10 mA at 50 Vdc, open circuit)
**Insulation Resistance:** Minimum, at 100 Vdc between adjacent closed contacts and also across open switch contacts. Initial: 2,000 Mohms
**Dielectric Strength:** Minimum voltage (AC RMS) measured between adjacent closed contacts and also across open switch contacts. Initial: 750 volts; After Life: 500 volts
**Carry Rating:** 5 amps, maximum rise of 20°C
**Switch Capacitance:** 2 pF at 1 megahertz

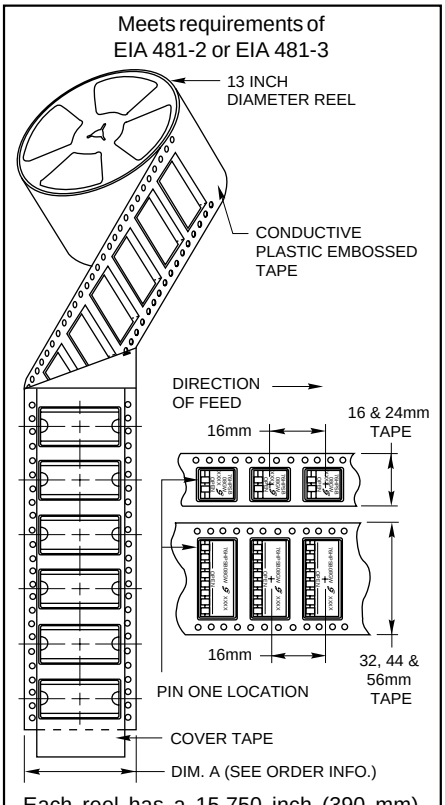
### Mechanical Ratings
**Mechanical Life:** 20,000 operations per switch position
**Vibration Resistance:** Per Method 204, Test Condition B. 1 mS opening (10 mS allowed)
**Mechanical Shock:** Per Method 213, Test Condition A. 1 mS opening (10 mS allowed)
**Thermal Shock Resistance:** Per specification; no failures; passes contact resistance
**Terminal Strength:** Per specification
**Thermal Aging:** 1,000 hours at 85°C; no failures

### Environmental Ratings
Meets all requirements of MIL- S-83504. Where Grayhill performance is superior, the MIL spec is listed in parentheses.
**Operating Temperature Range:** -40°C to + 85°C
**Storage Temperature Range:** -55°C to + 85°C
**Moisture Resistance:** Per specification, Method 106

### Soldering Information
**Solderability:** Per MIL-STD-202, Method 208 Tested to EIA Standard RS-448-2.
**Resistance to Soldering Heat:** Per MIL-S-83504, six second test
**Recommended Processing Temperature:** 220°C–230°C (1 pass—260°C maximum)
**Processing Position:** Switch is to be processed with all actuators in the closed (on) position as shipped.

### Materials and Finishes
**Shorting Member:** Brass, gold-plated, 10 microinches minimum over nickel barrier.
**Base Contacts:** Copper alloy, gold-plated, 10 microinches minimum over nickel barrier.
**Terminals:** Copper alloy, solder plated over nickel barrier.
**Non-Conductive Parts:** Cover is natural color thermoplastic, actuators are white thermoplastic (UL94V-O)
**Tape Seal:** Provided without tape seal. Contact Grayhill if tape seal is required.

## TAPE AND REEL PACKAGING




Each reel has a 15.750 inch (390 mm) minimum leader and a 6.30 inch (160 mm) minimum trailer.

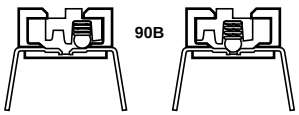
## ORDERING INFORMATION: Tape and Reel Packaging (500 switches per reel)

| No. of Positions* | Length (inches) | Length (metric) | Carrier Width Dim. A | Part Number |
|---|---|---|---|---|
| 2 | 0.280" | 7,1 mm | 24 mm | **76HPSB02GWR** |
| 4 | 0.480" | 12,2 mm | 24 mm | **76HPSB04GWR** |
| 6 | 0.680" | 17,3 mm | 32 mm | **76HPSB06GWR** |
| 8 | 0.880" | 22,4 mm | 44 mm | **76HPSB08GWR** |
| 10 | 1.080" | 27,4 mm | 44 mm | **76HPSB10GWR** |

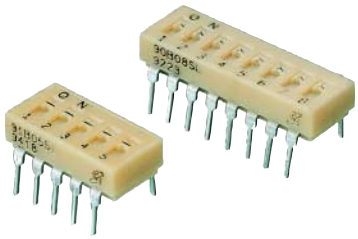
* For other lengths, contact Grayhill, Inc.

**Available from your local Grayhill Distributor.** For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

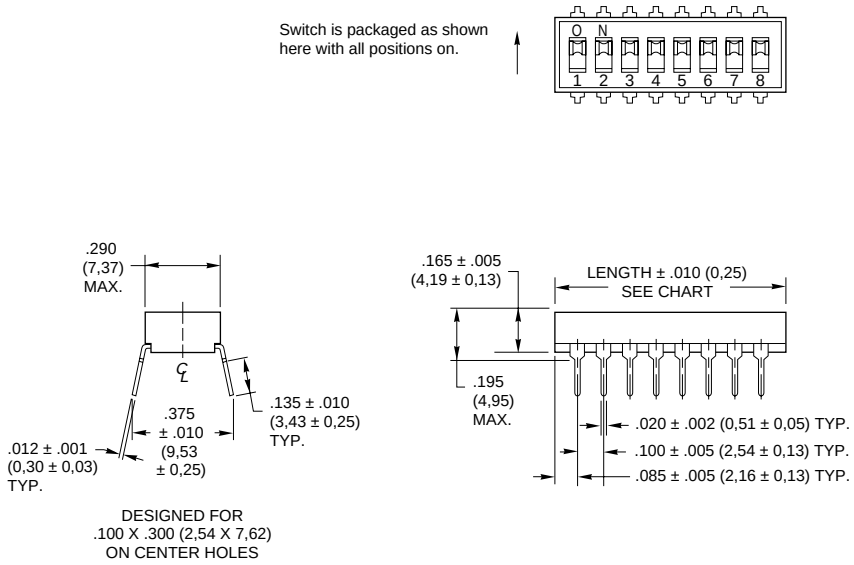
## SERIES 90B
**Machine Insertable MIDIP®**




### FEATURES
- Tested for TO-116 Equipment
- Up to 10 Positions
- High Pressure, Reliable Contacts
- Molded (Sealed) Base and Optional Top Seal

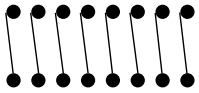


### DIMENSIONS In inches (and millimeters)




### CIRCUITRY

As viewed from the top of the switch in the positions shown in the drawing.



### ORDERING INFORMATION: Tube Packaging (Each tube is 19.5 inches long)

| No. of Positions | Length Inches | Length Metric | Number Per Tube | Part Number* |
|---|---|---|---|---|
| 2 | .270" | 6,9 mm | 60 | **90B02S** |
| 3 | .370" | 9,4 mm | 47 | **90B03S** |
| 4 | .470" | 11,9 mm | 37 | **90B04S** |
| 5 | .570" | 14,5 mm | 31 | **90B05S** |
| 6 | .670" | 17,0 mm | 26 | **90B06S** |
| 7 | .770" | 19,6 mm | 23 | **90B07S** |
| 8 | .870" | 22,1 mm | 20 | **90B08S** |
| 9 | .970" | 24,6 mm | 18 | **90B09S** |
| 10 | 1.070" | 27,2 mm | 16 | **90B10S** |

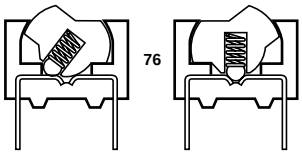
*The "S" at the end of the part number denotes top tape seal versions. To order without top tape seal, leave the "S" off the part number when ordering.

### ADDITIONAL INFORMATION

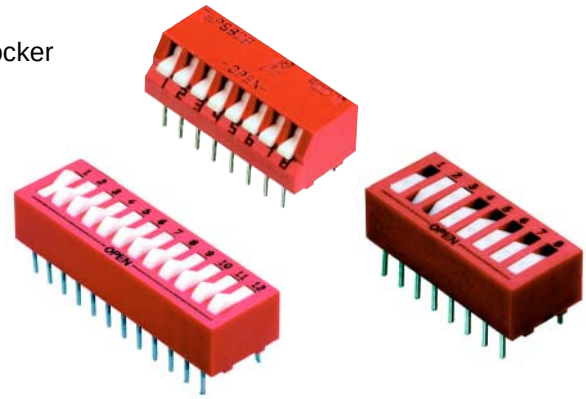
For Specifications, see page B-16.
For Options and Accessories, see page B-20.

**Available from your local Grayhill Distributor.**
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

# SERIES 76
## SPST Rocker

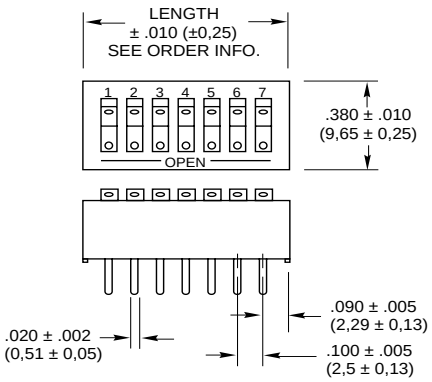



## FEATURES
- Raised and Recessed, Rocker and PIANO-DIP® Styles
- Sealed Base Standard
- Spring and Ball Contact
- Top Tape Seal Option



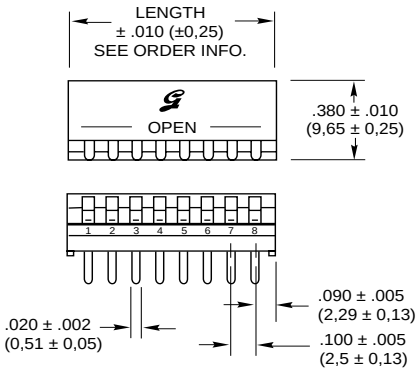
## DIMENSIONS In inches (and millimeters)

### Rocker and Recessed Rocker



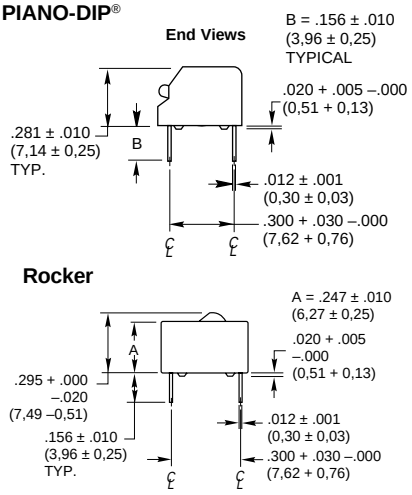

See also end view.

### Side Actuated PIANO-DIP®




See also end view.

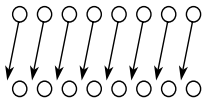
### PIANO-DIP®




For recessed rockers, delete .295 dimension.

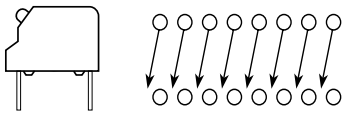
## CIRCUITRY

### Styles 76SB and 76RSB



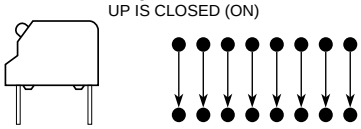
Typical circuit diagram with actuator as shown in the dimension drawing.

### Style 76PSB
UP IS OPEN (OFF)



Actuator shown in the up position.

### Styles 76PRB
UP IS CLOSED (ON)



Actuator shown in the up position.

## ORDERING INFORMATION

**76RSB04S**

**Series**
**Switch Style:** SB = Raised Rocker
RSB = Recessed Rocker
PSB = Piano-DIP (Up is Off)
PRB = Piano-DIP (Up is On)

**Seal*:** S = Tape Seal
Blank = No Seal
**Number of Positions:** 02 through 10, 12

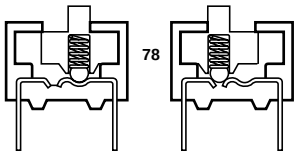
| No. of Pos. | Length (Inches) | Length (Metric) | No./Tube |
|---|---|---|---|
| 2 | 0.280" | 7,1 mm | 35 |
| 3 | 0.380" | 9,7 mm | 27 |
| 4 | 0.480" | 12,2 mm | 21 |
| 5 | 0.580" | 14,7 mm | 18 |
| 6 | 0.680" | 17,3 mm | 15 |
| 7 | 0.780" | 19,8 mm | 13 |
| 8 | 0.880" | 22,4 mm | 12 |
| 9 | 0.980" | 24,9 mm | 10 |
| 10 | 1.080" | 27,4 mm | 9 |
| 12 | 1.280" | 32,5 mm | 8 |

*A top tape seal is required for switches that are machine soldered or heavily cleaned after hand soldering. To order top seal versions, add "S" to the Grayhill part number.

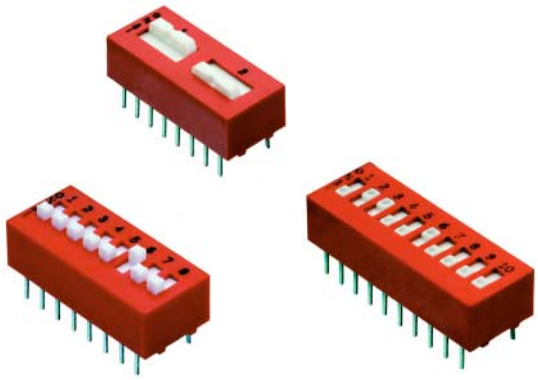
For Specifications, see page B-16.
For Options and Accessories, see page B-20.

**Available from your local Grayhill Distributor.** For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

## SERIES 78
### SPST To 4PST Slide

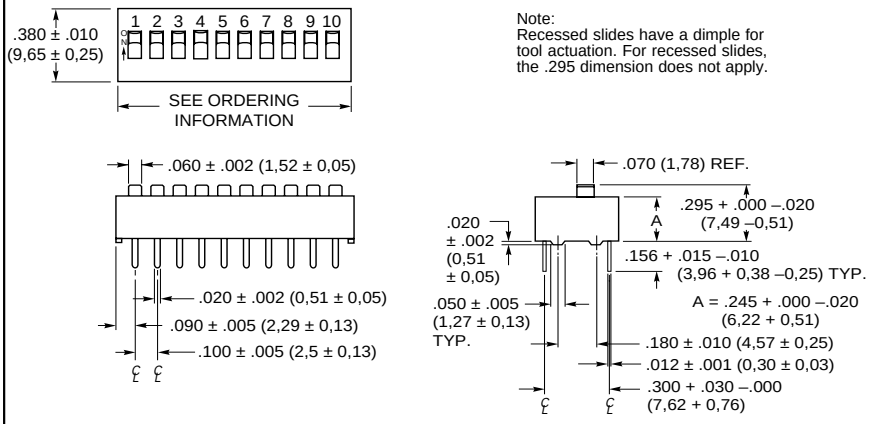



### FEATURES
- Raised and Recessed Slides
- SPST, 2PST, 3PST, 4PST
- Sealed Base Standard
- Spring and Ball Contact
- Top Tape Seal Option

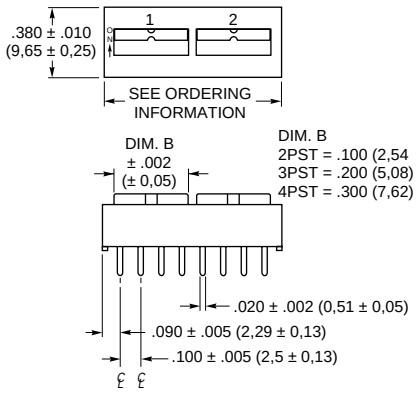


## DIMENSIONS In inches (and millimeters)

**Single Pole/Single Throw Switch in Raised and Recessed Slides**

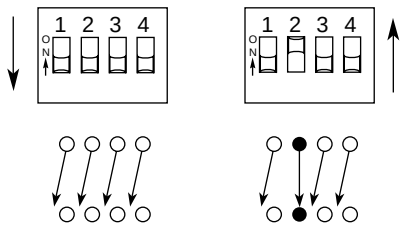



**Typical Multiple Pole Switch with Raised Slides**
(Switch shown here is 78H02, 4PST)

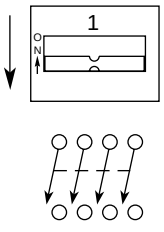



## CIRCUITRY

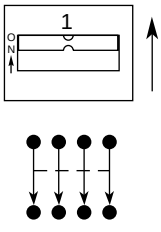
**Single Pole/Single Throw Switch**




**Typical Multiple Pole Switch**




**Typical Circuit Diagram**




For switches with 5, 6, 7, 8, or 10PST circuitry, contact Grayhill.

*A top tape seal is required for switches that are machine soldered or heavily cleaned after hand soldering. To order top seal versions, add "S" to the Grayhill part number.

## ORDERING INFORMATION

| Circuitry | No. of Positions | Length Inches | Length Metric | No./ Tube | Raised Slides* | Recessed Slides* |
|---|---|---|---|---|---|---|
| SPST | 2 | 0.280" | 7,1mm | 35 | **78B02** | **78RB02** |
| | 3 | 0.380" | 9,7mm | 27 | **78B03** | **78RB03** |
| | 4 | 0.480" | 12,2mm | 21 | **78B04** | **78RB04** |
| | 5 | 0.580" | 14,7mm | 18 | **78B05** | **78RB05** |
| | 6 | 0.680" | 17,3mm | 15 | **78B06** | **78RB06** |
| | 7 | 0.780" | 19,8mm | 13 | **78B07** | **78RB07** |
| | 8 | 0.880" | 22,4mm | 12 | **78B08** | **78RB08** |
| | 9 | 0.980" | 24,9mm | 10 | **78B09** | **78RB09** |
| | 10 | 1.080" | 27,4mm | 9 | **78B10** | **78RB10** |
| | 12 | 1.280" | 32,5mm | 8 | **78B12** | **78RB12** |
| 2PST | 1 | 0.280" | 7,1mm | 35 | **78F01** | Recessed Slides Not Available |
| | 2 | 0.480" | 12,2mm | 21 | **78F02** | |
| | 3 | 0.680" | 17,3mm | 15 | **78F03** | |
| | 4 | 0.880" | 22,4mm | 12 | **78F04** | |
| | 5 | 1.080" | 27,4mm | 9 | **78F05** | |
| | 6 | 1.280" | 32,5mm | 8 | 78F06 | |
| 3PST | 1 | 0.380" | 9,7mm | 27 | **78G01** | |
| | 2 | 0.680" | 17,3mm | 15 | **78G02** | |
| | 3 | 0.980" | 24,9mm | 10 | **78G03** | |
| 4PST | 1 | 0.480" | 12,2mm | 21 | **78H01** | |
| | 2 | 0.880" | 22,4mm | 12 | **78H02** | |

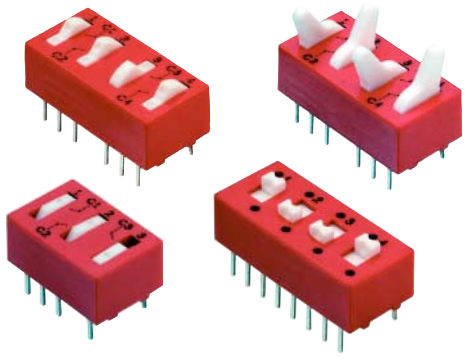
## ADDITIONAL INFORMATION

For Specifications see page B-16.
For other Options and Accessories, see pages B-20 and B-21.

**Available from your local Grayhill Distributor.**
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

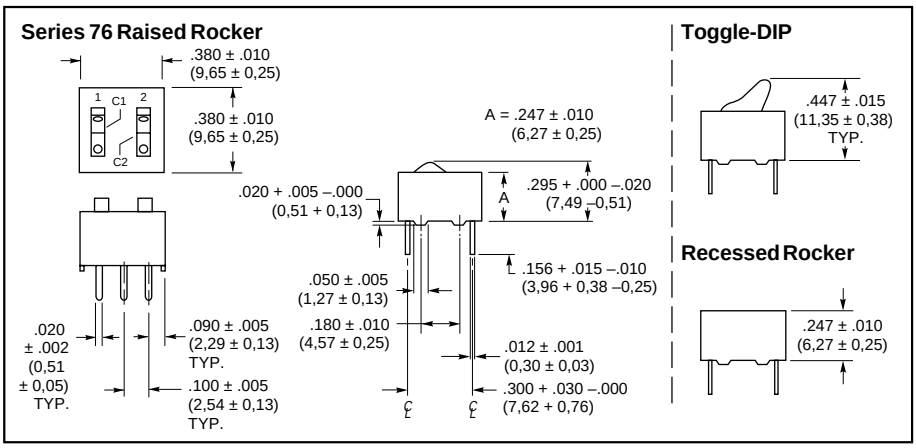
# SERIES 76 and 78
## SPDT

### FEATURES
- Raised and Recessed Rocker, and Toggle Actuated Styles
- SPDT with a Common Pole, or SPDT with 2 Isolated Circuits
- Spring and Ball Contact
- Top Tape Seal Option for Most Styles



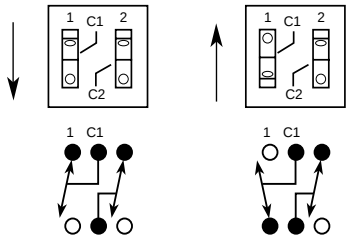


## DIMENSIONS: Series 76 In inches (and millimeters)

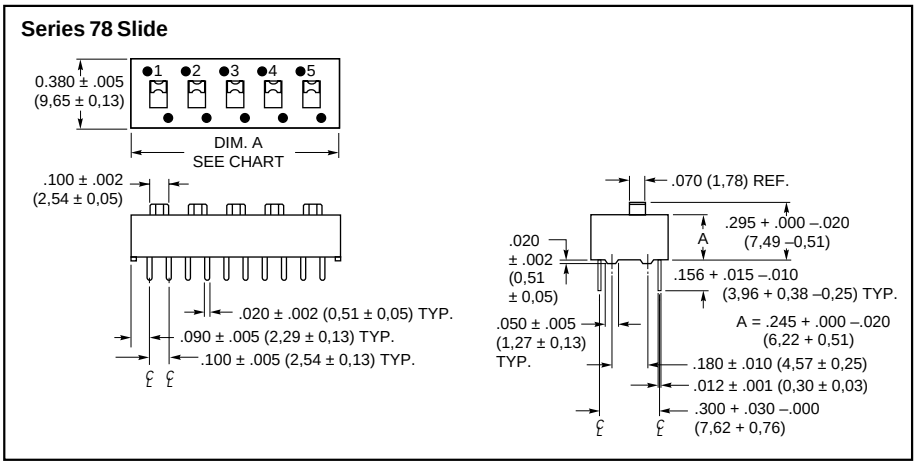



## CIRCUITRY: Series 76

**SPDT with Common**
True Form C Switching

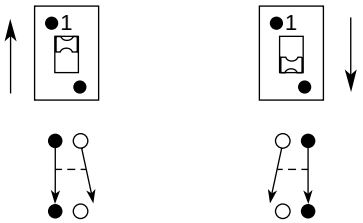



## DIMENSIONS: Series 78 In inches (and millimeters)




## CIRCUITRY: Series 78

**SPDT, 2 Circuits**
(No Commons)
Dot on cover indicates active terminal when slide is on that side of switch. Contact is made with terminal on opposite side.




To create common poles, tie together 2 adjoining terminals on 1 (either) side of switch.

## ORDERING INFORMATION

| Circuitry | Positions | Length Inches | Length Metric | No./ Tube | Raised Type* | Recessed Rockers* | Toggle-DIP* |
|---|---|---|---|---|---|---|---|
| SPDT Form C | 2 | 0.380" | 9,7mm | 27 | **76SC02** | **76RSC02** | **76STC02** |
| | 3 | 0.580" | 14,7mm | 18 | **76SC03** | **76RSC03** | **76STC03** |
| | 4 | 0.780" | 19,8mm | 13 | **76SC04** | **76RSC04** | **76STC04** |
| SPDT 2 Circuits | 1 | 0.280" | 7,1mm | 35 | **78J01** | — | — |
| | 2 | 0.480" | 12,2mm | 21 | **78J02** | — | — |
| | 3 | 0.680" | 17,3mm | 15 | **78J03** | — | — |
| | 4 | 0.880" | 22,4mm | 12 | **78J04** | — | — |
| | 5 | 1.080" | 27,4mm | 9 | **78J05** | — | — |
| | 6 | 1.280" | 32.5mm | 8 | **78J06** | | |

*To order top seal versions, add "S" to the Grayhill part number. Not available on Toggle-DIP.

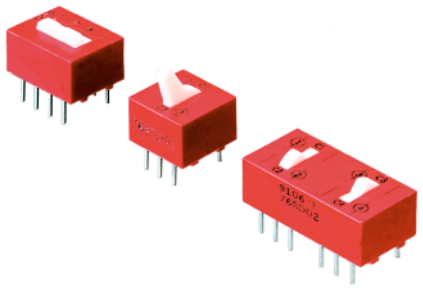
## ADDITIONAL INFORMATION

For Specifications, see page B-16. For Options and Accessories, see pages B-20 and B-21.

**Available from your local Grayhill Distributor.** For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

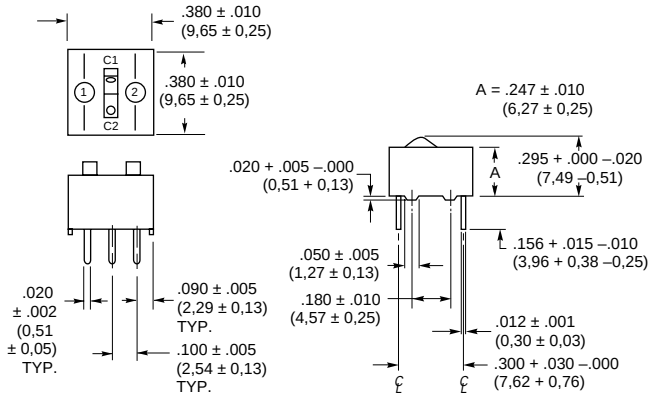
# SERIES 76 and 78
## DPDT

### FEATURES
- Raised and Recessed Rocker, and Toggle Actuated Styles
- DPDT with Common Poles, or DPDT with 4 Isolated Circuits
- Spring and Ball Contact
- Top Tape Seal Option for Most Styles

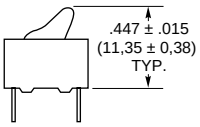


## DIMENSIONS: Series 76 In inches (and millimeters)

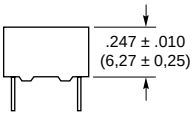
**Series 76 Raised Rocker, Double-DIP**




**Toggle-DIP**

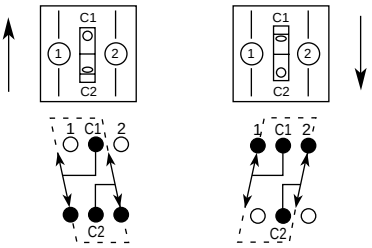



**Recessed Rocker**



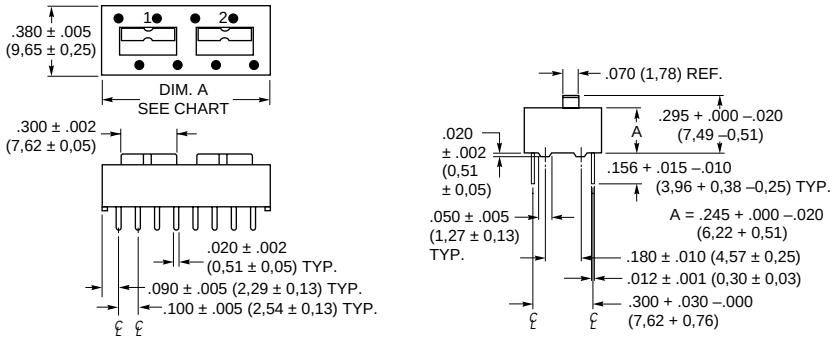

## CIRCUITRY: Series 76

**DPDT with Commons**
True Form D Switching



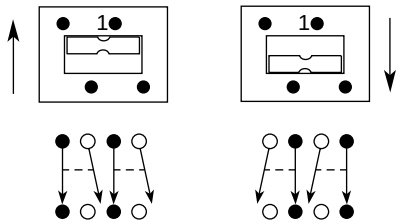

## DIMENSIONS: Series 78 In inches (and millimeters)

**Series 78 Slide**




## CIRCUITRY: Series 78

**DPDT, 4 Circuits**
(No Commons)
Dot on cover indicates active terminal when slide is on that side of switch. Contact is made with terminal on opposite side.




To create common poles, tie together 2 adjoining terminals on 1 (either) side of switch.

## ORDERING INFORMATION

| Circuitry | No./ Positions | Length Inches | Length Metric | No./ Tube | Raised Type* | Recessed Rockers* | Toggle-DIP* |
|---|---|---|---|---|---|---|---|
| DPDT Form D | 1<br>2 | 0.380"<br>0.780" | 9,7mm<br>19,8mm | 27<br>13 | **76SD01**<br>**76SD02** | **76RSD01**<br>**76RSD02** | **76STD01**<br>**76STD02** |
| DPDT 4 Circ. | 1<br>2 | 0.480"<br>0.880" | 12,2mm<br>22,4mm | 21<br>12 | **78K01**<br>**78K02** | —<br>— | —<br>— |

A top tape seal is required for switches that are machine soldered or heavily cleaned after hand soldering. To order top seal versions, add "S" to the Grayhill part number. Not available on Toggle-DIP.

## ADDITIONAL INFORMATION

For Specifications, see page B-16. For other Options and Accessories, see pages B-20 and B-21.

**Available from your local Grayhill Distributor.**
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

## SPECIFICATIONS: Standard and Military Qualified Styles

| Ratings | 76 | 78 | 90B |
|---|---|---|---|
| **Mechanical Life:** Operations per switch position | 20,000 | 20,000 | 5,000 |
| **Make-and-break Current Rating:** Operations per switch position at these resistive loads | | | |
| 1 mA, 5 Vdc; 50 mA, 30 Vdc; or 150 mA, 30 Vdc: | 10,000 | 10,000 | — |
| 10 mA, 30 Vdc; or 10 mA, 50 mVdc: | — | — | 2,000 |
| 10 mA, 50 mVdc; or 25 mA, 24 Vdc; or 100 mA, 6 Vdc: | — | — | 2,000 |
| **Contact Resistance:** Initially: | ≤ 30 mΩ | ≤ 30 mΩ | ≤ 20 mΩ |
| After life, at 10 mA, 50 mVdc, open circuit: | ≤ 100 mΩ | ≤ 100 mΩ | ≤ 100 mΩ |
| **Insulation Resistance:** Minimum, at 100 Vdc between adjacent closed contacts and also across open switch contacts | | | |
| Initially (Mohms): | 5,000 | 5,000 | 5,000 |
| After life (Mohms): | 1,000 | 1,000 | 1,000 |
| **Dielectric Strength:** Minimum voltage (AC, RMS) measured between adjacent closed contacts and also across open switch contacts. | | | |
| Initially: | 750 V | 750 V | 500 V |
| After life: | 500 V | 500 V | 500 V |
| **Current Carry Rating:** Maximum rise of 20°C | 5 A | 4 A | 3 A |
| **Switch Capacitance:** At 1 megahertz | 2 pF | 2 pF | 2 pF |
| **Operating Temperature Range:** | -40°C to + 85°C | -40°C to + 85°C | -40°C to + 85°C |
| **Storage Temperature Range:** | -55°C to + 85°C | -55°C to + 85°C | -55°C to + 85°C |

### Mechanical Ratings

**Vibration Resistance:** Per Method 204, Test Condition B, 1 mS opening (10 mS allowed)
**Mechanical Shock:** Per Method 213, Test Condition A. 1 mS opening (10 mS allowed)
**Thermal Shock Resistance:** Per specification; no failures; passes contact resistance.
**Terminal Strength:** Per specification
**Thermal Aging:** 1,000 hours at 85°C; no failures.

### Environmental Ratings

Meets all requirements of MIL- S-83504. Where Grayhill performance is superior, the MIL spec is listed in parentheses.
**Moisture Resistance:** Per specification, Method 106.

### Soldering Information

Series 90 MIDIP® and Series 76 recessed rocker (76RSB style) sealed switches have been tested to EIA Standard RS-448-2. Similar performance can be expected from other sealed Series 76 and 78 DIP switches.
**Solderability:** Per MIL-STD-202, Method 208
**Resistance to Soldering Heat:** 76RSB: Passes EIA Standard using two, four, and six second soldering time. 90: Per MIL-S-83504, six second test.
**Fluxing:** Per EIA RS-448-2 with flux touching switch body.
**Cleaning:** 76RSB, 90: Passes immersion test using water/detergent. Acceptable solutions include 1-1-1 trichlorethane, freon, (TF, TE, or TMS), isopropyl alcohol, detergent (140°F maximum). Terpene acceptable for Series 90 only. Solutions which are not recommended include acetone, methylene chloride, freon TMC.

### Materials and Finishes

**Shorting Member (Ball):** Brass, gold-plated 10 microinches minimum over nickel barrier.
**Base Contacts:** Copper alloy, gold-plated 10 microinches minimum over nickel barrier.
**Terminals:** Copper alloy, solder-plated over nickel barrier.
**Non-Conductive Parts:** Thermoplastic (UL94V-O)
**Potting Material:** Epoxy, 76,78 only.
**Protective Cover:** 76,78, only-Polycarbonate.

### Tape and Reel Packaging

**Tape Seal:**
76, 78: Polyester film
90: Polyimide film or foil
**Tape Seal Integrity:** Passes gross leak test using 125°C flourinert for 20 seconds minimum. Reference MIL-STD-202, Method 112.

## SERIES 76, 78 and 90
### Military Qualified

### FEATURES
- All switches listed on these pages are qualified to MS83504

### TOP SEAL
All Grayhill DIP Switch part numbers ending in "S" have a tape seal. This is now the standard for military qualified DIP switches. If you order by the military "M" number, you will also get the tape seal version. The exception is the toggle actuated styles which are not top tape sealed.

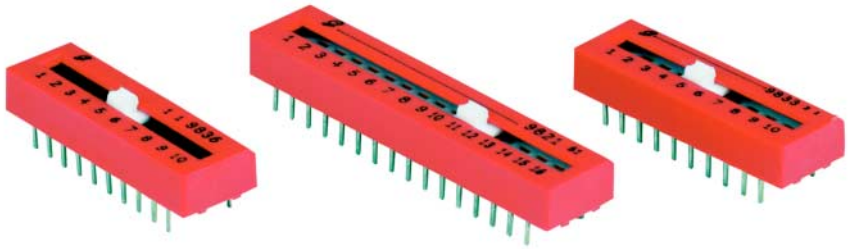
### ORDERING INFORMATION

| Circuitry | Description | Number of Positions | Military Part Number | Grayhill Part Number |
|---|---|---|---|---|
| Single Pole/Single Throw | Raised Rocker | 02 | M83504/01-022 | 76MSB02S |
| Single Pole/Single Throw | Raised Rocker | 03 | M83504/01-023 | 76MSB03S |
| Single Pole/Single Throw | Raised Rocker | 04 | M83504/01-024 | 76MSB04S |
| Single Pole/Single Throw | Raised Rocker | 05 | M83504/01-025 | 76MSB05S |
| Single Pole/Single Throw | Raised Rocker | 06 | M83504/01-026 | 76MSB06S |
| Single Pole/Single Throw | Raised Rocker | 07 | M83504/01-027 | 76MSB07S |
| Single Pole/Single Throw | Raised Rocker | 08 | M83504/01-028 | 76MSB08S |
| Single Pole/Single Throw | Raised Rocker | 09 | M83504/01-029 | 76MSB09S |
| Single Pole/Single Throw | Raised Rocker | 10 | M83504/01-030 | 76MSB10S |
| Single Pole/Single Throw | Raised Rocker | 12 | M83504/01-032 | 76MSB12S |
| Single Pole/Single Throw | Recessed Rocker | 02 | M83504/02-022 | 76MRSB02S |
| Single Pole/Single Throw | Recessed Rocker | 03 | M83504/02-023 | 76MRSB03S |
| Single Pole/Single Throw | Recessed Rocker | 04 | M83504/02-024 | 76MRSB04S |
| Single Pole/Single Throw | Recessed Rocker | 05 | M83504/02-025 | 76MRSB05S |
| Single Pole/Single Throw | Recessed Rocker | 06 | M83504/02-026 | 76MRSB06S |
| Single Pole/Single Throw | Recessed Rocker | 07 | M83504/02-027 | 76MRSB07S |
| Single Pole/Single Throw | Recessed Rocker | 08 | M83504/02-028 | 76MRSB08S |
| Single Pole/Single Throw | Recessed Rocker | 09 | M83504/02-029 | 76MRSB09S |
| Single Pole/Single Throw | Recessed Rocker | 10 | M83504/02-030 | 76MRSB10S |
| Single Pole/Single Throw | Recessed Rocker | 12 | M83504/02-032 | 76MRSB12S |
| Single Pole/Single Throw | Slide | 02 | M83504/04-022 | 78M02S |
| Single Pole/Single Throw | Slide | 03 | M83504/04-023 | 78M03S |
| Single Pole/Single Throw | Slide | 04 | M83504/04-024 | 78M04S |
| Single Pole/Single Throw | Slide | 05 | M83504/04-025 | 78M05S |
| Single Pole/Single Throw | Slide | 06 | M83504/04-026 | 78M06S |
| Single Pole/Single Throw | Slide | 07 | M83504/04-027 | 78M07S |
| Single Pole/Single Throw | Slide | 08 | M83504/04-028 | 78M08S |
| Single Pole/Single Throw | Slide | 09 | M83504/04-029 | 78M09S |
| Single Pole/Single Throw | Slide | 10 | M83504/04-030 | 78M10S |
| Single Pole/Single Throw | Slide | 12 | M83504/04-032 | 78M12S |
| Single Pole/Single Throw | Machine Insertable | 02 | M83504/12-002 | 90MB02S |
| Single Pole/Single Throw | Machine Insertable | 03 | M83504/12-003 | 90MB03S |
| Single Pole/Single Throw | Machine Insertable | 04 | M83504/12-004 | 90MB04S |
| Single Pole/Single Throw | Machine Insertable | 05 | M83504/12-005 | 90MB05S |
| Single Pole/Single Throw | Machine Insertable | 06 | M83504/12-006 | 90MB06S |
| Single Pole/Single Throw | Machine Insertable | 07 | M83504/12-007 | 90MB07S |
| Single Pole/Single Throw | Machine Insertable | 08 | M83504/12-008 | 90MB08S |
| Single Pole/Single Throw | Machine Insertable | 09 | M83504/12-009 | 90MB09S |
| Single Pole/Single Throw | Machine Insertable | 10 | M83504/12-010 | 90MB10S |
| Single Pole/Single Throw | Side Actuated | 02 | M83504/11-022 | 76MPSB02S |
| Single Pole/Single Throw | Side Actuated | 03 | M83504/11-023 | 76MPSB03S |
| Single Pole/Single Throw | Side Actuated | 04 | M83504/11-024 | 76MPSB04S |
| Single Pole/Single Throw | Side Actuated | 05 | M83504/11-025 | 76MPSB05S |
| Single Pole/Single Throw | Side Actuated | 06 | M83504/11-026 | 76MPSB06S |
| Single Pole/Single Throw | Side Actuated | 07 | M83504/11-027 | 76MPSB07S |
| Single Pole/Single Throw | Side Actuated | 08 | M83504/11-028 | 76MPSB08S |
| Single Pole/Single Throw | Side Actuated | 09 | M83504/11-029 | 76MPSB09S |
| Single Pole/Single Throw | Side Actuated | 10 | M83504/11-030 | 76MPSB10S |
| Single Pole/Single Throw | Side Actuated | 12 | M83504/11-032 | 76MPSB12S |
| Single Pole/Double Throw | Raised Rocker | 02 | M83504/05-022 | 76MSC02S |
| Single Pole/Double Throw | Raised Rocker | 03 | M83504/05-023 | 76MSC03S |
| Single Pole/Double Throw | Raised Rocker | 04 | M83504/05-024 | 76MSC04S |
| Single Pole/Double Throw | Recessed Rocker | 02 | M83504/06-022 | 76MRSC02S |
| Single Pole/Double Throw | Recessed Rocker | 03 | M83504/06-023 | 76MRSC03S |
| Single Pole/Double Throw | Recessed Rocker | 04 | M83504/06-024 | 76MRSC04S |

### ADDITIONAL INFORMATION
For dimensions and number per packaging tube, see equivalent non-qualified styles, pages B-11 through B-15. For Specifications, see page B-16.

**Available from your local Grayhill Distributor.**
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

# SERIES 79A
# SERIES 79C
## Linear Action Tap



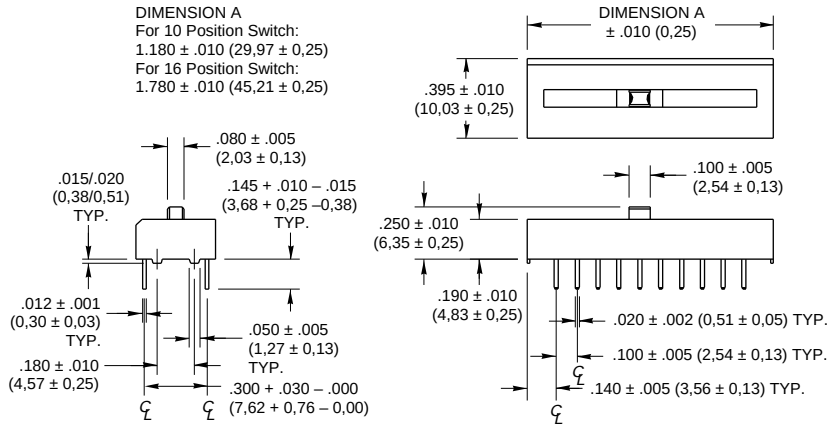
### FEATURES
- Single-Setting Programming
- Isolated or Bussed Circuits
- 10 or 16 Positions
- 125 mA, 6 Vdc, 2000 Cycles

### Circuit Selector
**Isolated Circuits in 10 and 16 Positions**
Each position is a single isolated circuit, which connects the two terminals across the switch package. The movable contact is non-shorting.

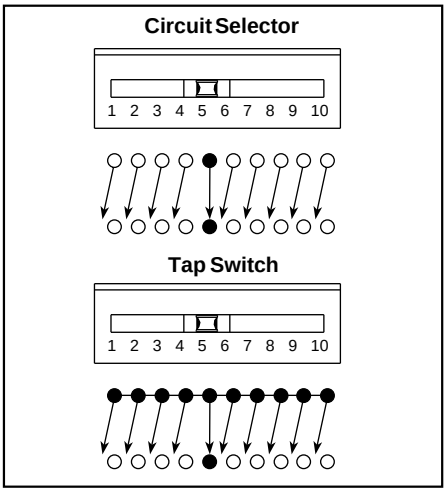
### Tap Switch
**SP/10 Positions, and SP/16 Postions**
All contacts on one side of the switch are internally bussed for a common pole. Any terminal on that side may be used as a common, the others may be clipped. The movable contact is non-shorting.



## DIMENSIONS In inches (and millimeters)




## CIRCUITRY




## SPECIFICATIONS

### Electrical Ratings
**Make-and-break Current Rating:** 2,000 cycles at 10 mA, 50 mVdc; 2,000 cycles at 125 mA, 6 Vdc; 2,000 cycles at 50 mA, 30 Vdc.
**Contact Resistance:** (measured at 10 mA, 50 mVdc) Coded Switches: 60 mohms maximum initially. Other Switches: 50 mohms maximum initially. After LIfe: 100 mohms maximum
**Insulation Resistance (at 100 Vdc):** Between adjacent isolated contacts: Initial:5,000 Mohms; 1,000 Mohms minimum after life. Across open contacts: Initial: 5,000 Mohms; 1,000 Mohms minimum after life.
**Dielectric Strength:** Between adjacent isolated contacts and also across open contacts. Initially: 750 Vac: 500 Vac after life
**Contact Carry Rating:** 2 Amps with a maximum contact temperature rise of 20°C

### Mechanical Ratings
**Mechanical Life:** 4,000 cycles minimum. Note: a cycle is one complete operation, back and forth through all switch positions.
**Vibration Resistance:** 10 to 2,000 Hz at 15G or 0.060" double amplitude, per MIL-STD-202F per MIL-5-83504; Method 213, Condition A. No damage and no contact openings exceeding 10 mS (Method 204, Test Condition B).
**Shock Resistance:** 509, 11 mS, half sine; no damage and no openings exceeding 10 mS (Method 213, Test Condition A).

### Environmental Rating
**Operating Temperature Range:** -40°C to +85°C
**Storage Temperature Range:** -55°C to +85°C
**Moisture Resistance:** 240 hours with temperature cycling and polarization, per MIL-STD-202F, Method 305

### Materials and Finishes
**Nonconductive Parts:** Plastic UL94V-O
**Shorting Arm:** Phosphor bronze, plated. 10 microinches minimum gold over 20 microinches minimum nickel
**Base Contacts:** Copper alloy, plated. 10 microinches minimum gold over 20 microinches minimum nickel
**Terminals:** Copper alloy, plated. 60 microinches minimum (90/10) tin lead solder over 20 microinches minimum nickel
**Potting Material:** Epoxy

### Tape and Seal Packaging
**Seal Strength:** Per MIL-STD-202, Method 112. 30 seconds at 125° hot Fluorocarbon
**Solderability:** Per MIL-STD-202, Method 208.
**Tape Seal:** Polyester film

## ORDERING INFORMATION

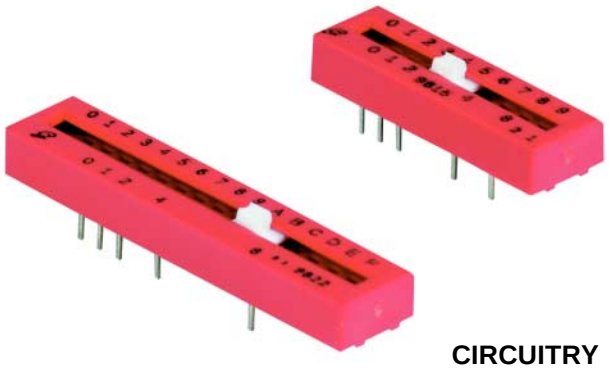
| Number of Positions | Type of Circuit Code | Number per Tube | Part Number* |
|---|---|---|---|
| 10 | Circuit Selector | 9 | **79A10** |
| 10 | Single Pole | 9 | **79C10** |
| 16 | Circuit Selector | 6 | **79A16** |
| 16 | Single Pole | 6 | **79C16** |

*A top tape seal is required for switches that are machine soldered or heavily cleaned after hand soldering. To order top seal versions, add "S" to the Grayhill part number.

## ADDITIONAL INFORMATION
For other Options and Accessories, see pages B-20 and B-21.

**Available from your local Grayhill Distributor.**
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

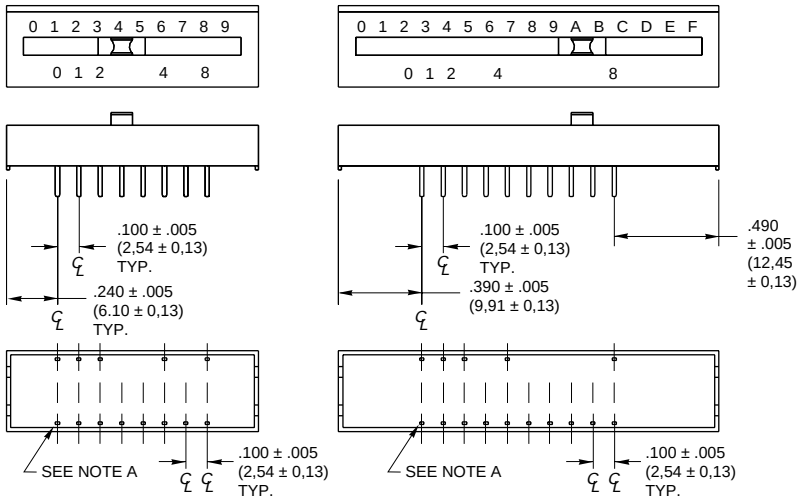
# SERIES 79B
## Linear Action Tap



### FEATURES
- Reliable Switching, Positive Detent
- Codes in BCD and Hexadecimal
- True Zero Output
- 10 or 16 Positions
- 2000 Cycle Life
- Up to 60,000 Detent Operations

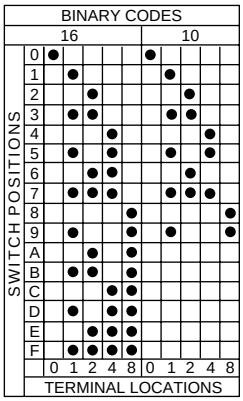
### DIMENSIONS In inches (and millimeters)

All dimensions not shown here are the same as those on the facing page.




NOTE A: All terminals on this side of the switch are bussed internally. Any one of them may be used as the common terminal.

### CIRCUITRY




Dot indicates contact made between contact and output terminal.

## SPECIFICATIONS

### Electrical Ratings
**Make-and-break Current Rating:** 2,000 cycles at 10 mA, 50 mVdc; 2,000 cycles at 125 mA, 6 Vdc; 2,000 cycles at 50 mA, 30 Vdc.
**Contact Resistance:** 100 mohms maximum after life, measured at 10 mA dc and 50 mV (open circuit). Initial values are 60 mohms maximum for coded switches, and 50 mohms for other linear action switches.
**Insulation Resistance (at 100 Vdc):** Between adjacent isolated contacts: Initial: 5,000 Mohms minimum; After Life: 1,000 Mohms minimum
Across open contacts: Initial: 5,000 Mohms minimum; After Life: 1,000 Mohms minimum
**Dielectric Strength:** Between adjacent isolated contacts and across open contacts. Initial: 750 Vac; After Life: 500 Vac
**Contact Carry Rating:** 2 amps with a maximum contact temperature rise of 20°C.

### Mechanical Ratings
**Mechanical Life:** 4,000 cycles minimum. Note: a cycle is one complete operation, back and forth through all switch positions.
**Vibration Resistance:** 10 to 2,000 Hz at 15G or 0.060" double amplitude; no damage and no contact openings exceeding 10 mS (Method 204, Test Condition B).
**Shock Resistance:** 509, 11 mS, half sine; no damage and no openings exceeding 10 microseconds (Method 213, Test Condition A).

### Environmental Ratings
Refer to MIL-STD-202F per MIL-S-83504
**Operating Temperature Range:** -40°C to +85°C
**Storage Temperature Range:** -55°C to +85°C
**Moisture Resistance:** 240 hours with temperature cycling and polarization, per MIL-STD-202F, Method 305

### Materials and Finishes
**Nonconductive Parts:** Plastic UL94V-O
**Shorting Arm:** Phosphor bronze, plated 10 microinches minimum gold over 20 microinches minimum nickel.
**Base Contacts:** Copper alloy, plated 10 microinches minimum gold over 20 microinches minimum nickel.
**Terminals:** Copper alloy, plated. 60 microinches minimum solder (90/10) over 20 microinches minimum nickel.
**Potting Material:** Epoxy

### Tape Seal and Packaging
**Tape Seal:** Polyester film

## ORDERING INFORMATION

| Number of Positions | Type of Circuit Code | Number per Tube | Part Number* |
|---|---|---|---|
| 10 | Binary Code Decimal | 9 | **79B10** |
| 16 | Hexadecimal | 6 | **79B16** |

*A top tape seal is required for switches that are machine soldered or heavily cleaned after hand soldering. To order top seal versions, add "S" to the Grayhill part number.

## ADDITIONAL INFORMATION
For other Options and Accessories, see pages B-20 and B-21.

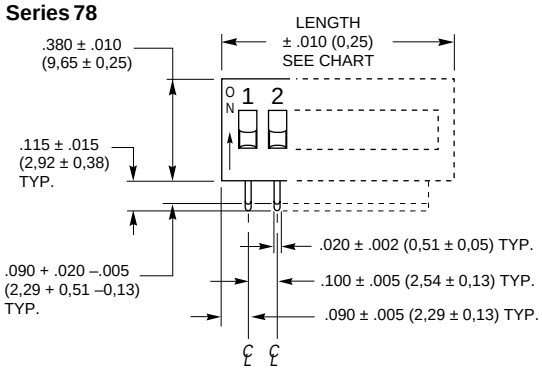
**Available from your local Grayhill Distributor.**
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

# SERIES 78
## Right Angle Option

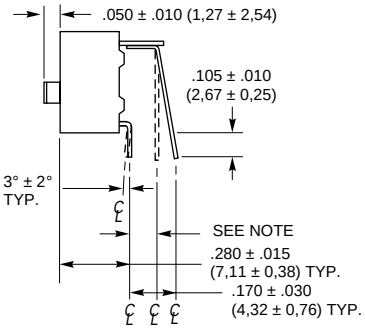
### FEATURES
- Easy Access
- SPST Circuitry

## DIMENSIONS In inches (and millimeters)

**Series 78**




Note: Switches are same length as standard switches. See chart or standard switch pages.




Note: Terminal row spacing is designed to be used in PC board holes with .100 X .100 (2,54 x 2,54) centers.

**SPST Switch Length**

| NO. OF STATIONS | LENGTH INCHES | LENGTH MILLIMETERS |
|---|---|---|
| 2 | 0.280 | 7,1 MM |
| 3 | 0.380 | 9,7 MM |
| 4 | 0.480 | 12,2 MM |
| 5 | 0.580 | 14,7 MM |
| 6 | 0.680 | 17,3 MM |
| 7 | 0.780 | 19,8 MM |
| 8 | 0.880 | 22,4 MM |
| 9 | 0.980 | 24,9 MM |
| 10 | 1.080 | 27,4 MM |
| 12 | 1.280 | 32,5 MM |

The 12 station length is for Series 76 switches. For switches of circuitry other than SPST, see standard switch pages.

## SPECIFICATIONS

### Electrical Ratings
**Make-and-break Current:**
At 1 mA, 5 Vdc: 10,000 operations
At 50 or 125 mA, 30 Vdc: 10,000 operations

### Materials and Finishes
**Terminal Ends:** Copper alloy, solder (90/10) plated 150 microinches minimum over copper/nickel barrier solderability per MIL-STD-202, Method 208

For other specifications, see Additional Information.

## CHOICES

| Circuitry | Type of Actuation | Series & Style | Number Of Positions | Other Options |
|---|---|---|---|---|
| SPST | Raised Slide | 78B | 02 thru 10 | S |
| SPST | Recessed Slide | 78RB | 02 thru 10 | S |
| 2PST | Raised Slide | 78F | 01 thru 05 | S |
| 3PST | Raised Slide | 78G | 01 thru 03 | S |
| 4PST | Raised Slide | 78H | 01 & 02 | S |
| SPDT-2 | Raised Slide | 78J | 01 thru 05 | S |
| DPDT-4 | Raised Slide | 78K | 01 & 02 | S |

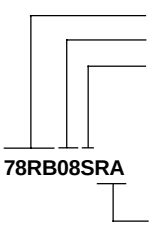
## ADDITIONAL INFORMATION

For SPST switches, see page B-12.
For Multipole/ST switches see page B-13.
For SPDT switches, see page B-14; and for DPDT switches, see page B-15.

For additional specifications, see page B-16.

## ORDERING INFORMATION

Sample number orders a right angle mount, top tape sealed, 8-position, SPST switch with recessed slides. Part number for the same switch without tape seal and lines would be 78RB08RA.




**Series and Style**
**Number of Positions**
**Other Options:**
S = Top Tape Seal

**Right Angle Option**

**Available from your local Grayhill Distributor.**
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

## OPTIONS

### Position Identification Line Option

**For Series 76RSB, 76RSC, 76RSD, & 90B**
A line can be added to the recessed rocker or Series 90 slide actuator to provide positive identification of the actuator position. To order, add L as a final suffix to the part number. For example, 76RSB08 becomes 76RSB08L; and, 90B08S becomes 90B08SL.
**Available from a local Grayhill Distributor.**

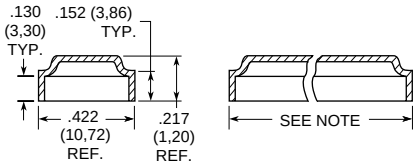
### Other Switch Markings

**For Series 76, 78, & 90**
We can mark your part number or other wording on the switch, often at no charge. For some markings there will be a nominal charge for tooling plus a set-up charge. In addition, there is a marking charge per side per switch. Add it to the unit price and discount it accordingly.
**To order, contact Grayhill.**

## ACCESSORIES

### Protective Cover Accessory

**For Series 76, & 78**
Rigid, clear plastic cover fits all but toggle actuated switches. It provides a top cover for less strenuous cleaning, serves as a dust cover in dirty environments, and provides protection against accidental actuation.
**Material:** 76,78, only-Polycarbonate.
Purchase as a separate item. Check length of the desired DIP Switch, and then select from the ordering information on this page.
**Available from a local Grayhill Distributor.**




Note: For length, add .042 "(1,07 MM) to length of DIP switch.

### DIPSTICK Accessory

**For all series**
Pen-sized plastic DIPSTICK has a tapered end for actuating DIP Switches.

Part Number ..... **90-DIPSTICK**

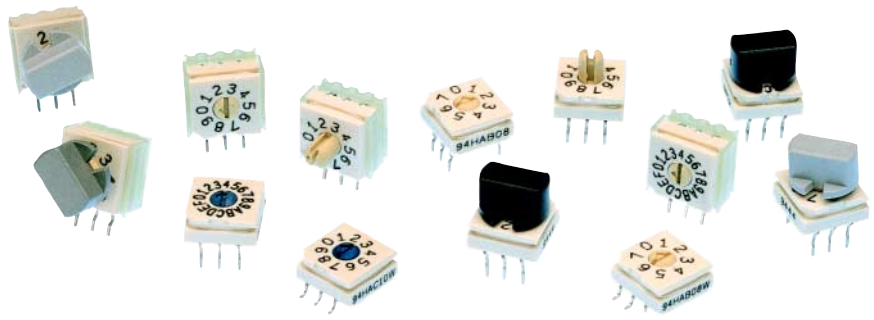
**Available from a local Grayhill Distributor**

## ORDERING INFORMATION

| Length Inches | Protective Cover Part Number |
|---|---|
| 0.280 | **76P02** |
| 0.380 | **76P03** |
| 0.480 | **76P04** |
| 0.580 | **76P05** |
| 0.680 | **76P06** |
| 0.780 | **76P07** |
| 0.880 | **76P08** |
| 0.980 | **76P09** |
| 1.080 | **76P10** |
| 1.180 | **79P10** |
| 1.780 | **79P16** |

**Available from your local Grayhill Distributor.**
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

# SERIES 94H
## Binary Coded



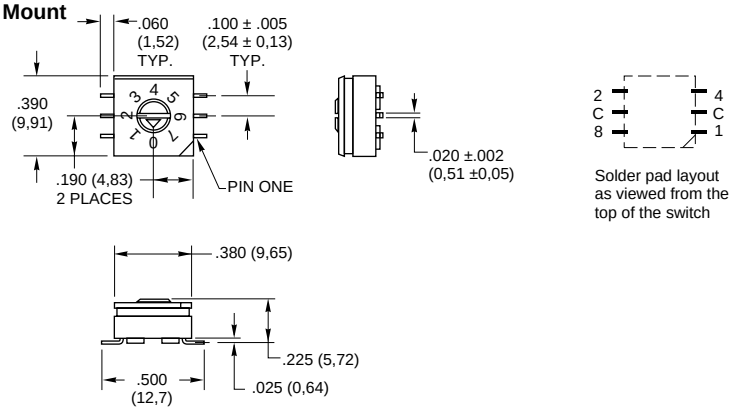
## FEATURES

- Sealed Construction; No Tape Seal Required
- Surface Mount or Thru-Hole Style
- Tube or Tape and Reel Packaging
- Octal, BCD, and Hexadecimal Code
- In Standard or Complement
- Standard and Right Angle Mount
- Flush or Extended Actuators
- Gold-Plated Contacts

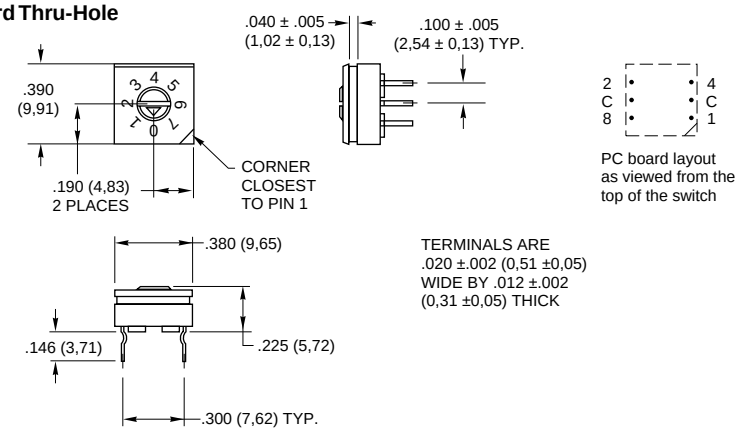
## DIMENSIONS In inches (and millimeters)

Tolerances are ± .010 inches unless specified otherwise.

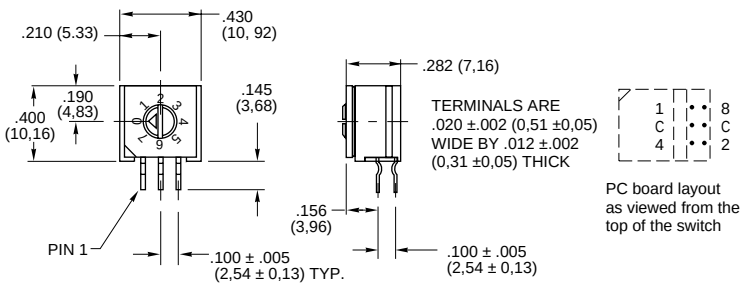
**Surface Mount**




**Standard Thru-Hole**




**Right Angle Thru-Hole**




## ACTUATOR STYLES/FACTUATOR STYLES

**Octal–8 position**

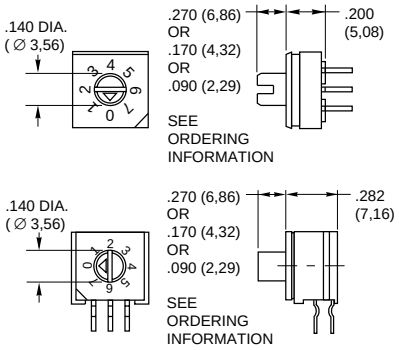
**BCD–10 position**

**Hex–16 position**

**Figure 1** **Figure 2**

All actuation types are available in octal (8), binary coded decimal (10), or hexadecimal (16) codes; with either standard or complement output. Standard code outputs have natural color rotors; complements in a contrasting color.

## EXTENDED ACTUATOR TYPES



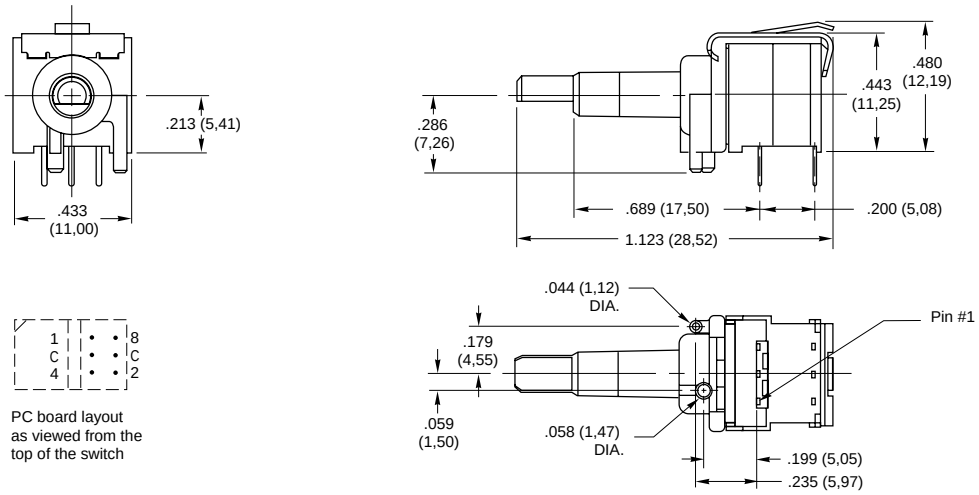
# SERIES 94R

## Economical, Binary Coded

### FEATURES

- 10,000 Cycles of Operation
- Gold-Plated Contacts
- Sealed Contact System
- Right Angle Mount
- Octal, BCD & Hexadecimal Codes
- Standard or Complement

### DIMENSIONS In inches (and millimeters)




Unless otherwise indicated, tolerances are ± .010 (0,25)

## SPECIFICATIONS: Series 94H and 94R

### Electrical Ratings

**Make-and-break Current Rating:** 30 mA at 30 Vdc for 10,000 cycles of operation.
**Carrying Current Rating:** 100 mA at 50 Vdc
**Contact Resistance:** 50 mohms maximum initially (measured at 10 mA, 50 mVdc). 150 mohms maximum after life.
**Insulation Resistance:**(measured at 100 Vdc across open switch contacts)
Initial: 5000 Mohms minimum. After Life: 1000 Mohms minimum.
**Dielectric Strength:** (measured across open switch contacts) Initial: 500 Vac RMS minimum. After Life: 250 Vac RMS

### Mechanical Ratings

**Mechanical Life:** 10,000 cycles of operation. One cycle is a rotation through all positions and a complete return through all positions.
**Mechanical Shock:** 1000g's, 0.5 mS, half sine per MIL-STD-202F, Method 213, Test Condition E.
**Vibration Resistance:** 10-2000 Hz at 15G or 0.060" double amplitude per MIL-STD-202F, Method 204, Test Condition B.
**Operational Torque:** 2 to 6 inch-ounces initially and 1.2 inch-ounces minimum after life.

### Environmental Ratings

**Operating Temperature Range:** -40 to +85° C.
**Storage Temperature Range:** -40° to +85° C.
**Moisture Resistance:** 240 hours with temperature cycling and polarization. Passes insulation resistance and dielectric strength per MIL-STD-202F, Method 106 following exposure.

### Materials and Finishes

**Rotor and Switch Body:** Plastic (UL94V-O)
**Contact Material:** Copper alloy, plated. 30 microinches minimum gold over 50 microinches minimum nickel.
**Shorting Member:** Copper alloy, plated. 30 microinches minimum gold over 50 microinches minimum nickel.
**Terminals:** Copper alloy, plated. 100 microinches minimum 90/10 tin lead solder over 50 microinches minimum nickel.
**Internal O-ring:** Rubber BUNA-N

### Soldering Information

**Soldering Temperature:** 250° C for 10 seconds maximum.
**Cleaning:** Acceptable solutions include 1-1-1 Trichlorenthane, Freon (TF, TE, or TMS), Isopropyl Alcohol and detergent (140°F maximum). Solutions which are not recommended include Acetone, Methylene Chloride, and Freon TMC.

## CODE & TRUTH TABLES:

### Series 94H and 94R

Standard Output

| SWITCH POSITION | CODE OUTPUT 1 | 2 | 4 | 8 |
|---|---|---|---|---|
| 0 | | | | |
| 1 | ● | | | |
| 2 | | ● | | |
| 3 | ● | ● | | |
| 4 | | | ● | |
| 5 | ● | | ● | |
| 6 | | ● | ● | |
| 7 | ● | ● | ● | |
| 8 | | | | ● |
| 9 | ● | | | ● |
| A | | ● | | ● |
| B | ● | ● | | ● |
| C | | | ● | ● |
| D | ● | | ● | ● |
| E | | ● | ● | ● |
| F | ● | ● | ● | ● |

Complement Output

| SWITCH POSITION | CODE OUTPUT 1 | 2 | 4 | 8 |
|---|---|---|---|---|
| 0 | ● | ● | ● | ● |
| 1 | | ● | ● | ● |
| 2 | ● | | ● | ● |
| 3 | | | ● | ● |
| 4 | ● | ● | | ● |
| 5 | | ● | | ● |
| 6 | ● | | | ● |
| 7 | | | | ● |
| 8 | ● | ● | ● | |
| 9 | | ● | ● | |
| A | ● | | ● | |
| B | | | ● | |
| C | ● | ● | | |
| D | | ● | | |
| E | ● | | | |
| F | | | | |

Dot indicates terminal to common connection. All switches are continuous rotation.

Octal and Octal Complement outputs are 0 thru 7 positions.

BCD and BCD Complement outputs are 0 thru 9 positions.

Hexadecimal and Hexadecimal Complement outputs are 0 thru F positions.

Standard codes have natural color rotors; complements have rotors in a contrasting color.

## ORDERING INFORMATION: Series 94H

94HAB10WR

**Series**
**Actuator Style:** A = Flush, Figure 1
B = .27, Figure 1 (see page B-20)
C = .17, Figure 1 (see page B-20)
E = .09, Figure 1 (see page B-20)
F = Flush, Figure 2
**Code:** B = Standard, C = Complementary

**Packaging:** R = Tape and Reel
Blank = Tube*
**Terminal Style:** RA = Right Angle, Thru-Hole
W = Surface Mount
Blank = Thru-Hole
**Number of Positions:** 08 = Octal, 8 Position
10 = BCD, 10 Position
16 = Hex, 16 Position

* 27 Pieces per tube for surface mount and perpendicular, 24 pieces per tube for right angle switches.

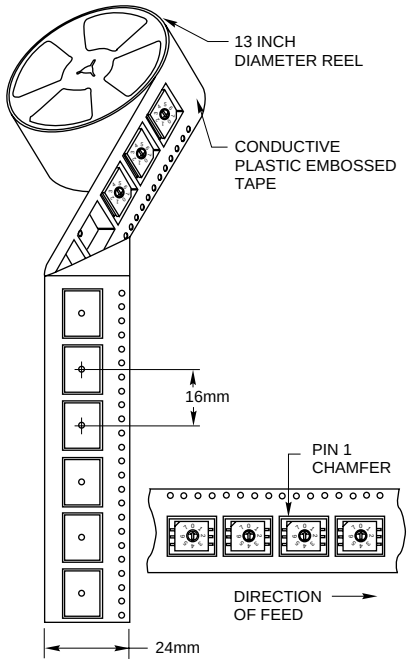
## ORDERING INFORMATION: Series 94R

| Continuous Rotation Versions | | | |
|---|---|---|---|
| **Code** | **No. of Positions** | **Standard Code Part Number** | **Complement Part Number** |
| Octal<br>BCD<br>Hexadecimal | 8<br>10<br>16 | **94RB08C**<br>**94RB10C**<br>**94RB16C** | **94RC08C**<br>**94RC10C**<br>**94RC16C** |
| **Rotational Stop Versions*** | | | |
| **Code** | **No. of Positions** | **Standard Code Part Number** | **Complement Part Number** |
| Hexadecimal | 16 | **94RB16F** | **94RC16F** |

* Consult Grayhill for 8 or 10 position

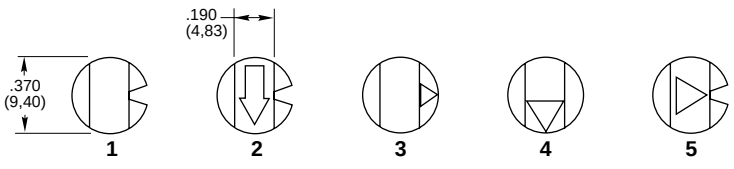
## TAPE AND REEL PACKAGING: Series 94H

Meets requirements of EIA 481-2.

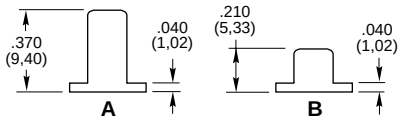



Each reel contains 750 switches with a 15.35 inch (390 mm) minimum leader and a 6.30 inch (160 mm) minimum trailer.

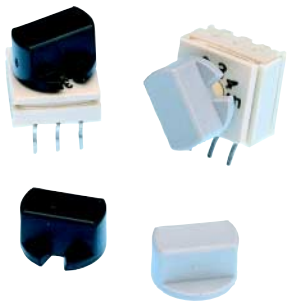
## SERIES 94 High Temperature Knobs: For Shaft Extensions




Slotted knobs show switch markings. Contact Grayhill for other knob material/ marking color combinations and geometrics.




* Use only with Actuator Type B or C



## ORDERING INFORMATION: Series 94 High Temperature Knobs*

| Knob Style and Height | Knob Color | Arrow Color | Part Number |
|---|---|---|---|
| 1A | Gray | N/A | **947706-001** |
| 5A | Gray | Black | **947706-005** |
| 1B | Black | N/A | **947705-001** |
| 1B | Gray | N/A | **947705-012** |
| 2B | Gray | White | **947705-004** |
| 3B | Gray | Black | **947705-017** |
| 4B | Gray | Black | **947705-018** |
| 1B | Natural | N/A | **947705-009** |
| 4B | Black | White | **947705-010** |
| 5B | Gray | Black | **947705-019** |

*Ordered as a separate item.

**Available from your local Grayhill Distributor.** For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.