

# HB Series

## Single Pole Standard Precision Snap-acting Switches

### Features/Benefits

- Low differential travel, high repeatability
- Long life—150,000 cycles typical
- Single and double pole circuitry
- Sealed actuator and case

### Typical Applications

- Thermostats
- Motors
- Industrial controls



### Specifications

CONTACT RATING: From low level\* to 20 AMPS @ 480 V AC; see ELECTRICAL RATING option section for complete listings.

ELECTRICAL LIFE: 150,000 cycles at 20 AMPS @ 250 V AC. consult Customer Service Center for typical life at other ratings.

INSULATION RESISTANCE: 1,000 M ohm min.

DIELECTRIC STRENGTH: 1,500 Vrms min. @ sea level.

OPERATING TEMPERATURE: -67°F to 302°F (-55°C to 150°C).

OPERATING FORCE: From 4 oz. to 26 oz. max. at actuator button available.

MOUNTING SCREWS: Torque 3 in/lbs max.  
(Note: Exceeding 3 in/lbs torque may change operating characteristics and increase the possibility of cracking switch case).

TERMINAL SCREWS: Torque 4 in/lbs max.

PANEL MOUNTING BUSHING: Torque 4-6 in/lbs max.

DEGREE OF PROTECTION: IP65; Dust-proof, water splash and dew condensation.

\* Low Level=conditions where no arcing occurs during switching, i.e., 0.4 VA max. @ 20 V AC or DC max.

### Materials

SWITCH HOUSING: Heat resistant/electrical grade phenolic.

INSERTS: Brass alloy.

ACTUATOR BUTTON: Moisture resistant phenolic.

SPRING: Copper alloy.

PIVOT: Brass alloy.

MOVABLE CONTACTS: Gold alloy for ratings 1 AMP or less.  
Fine silver for ratings greater than 1 AMP and motor load ratings less than 1/2 HP @ 125 V AC. Silver alloy for motor load ratings 1/2 HP @ 125 V AC or greater.

STATIONARY CONTACTS: Gold alloy for ratings 1 AMP or less.  
Fine silver welded to copper base for ratings greater than 1 AMP and motor load ratings less than 1/2 HP @ 125 V AC. Silver alloy on copper base for motor load ratings 1/2 HP @ 125 V AC or greater.

TERMINALS: Brass alloy, bright tin plated.

**NOTE:** Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

### Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages J-50 thru J-54. For additional options not shown in catalog, consult Customer Service Center.

|                                                                                                                                                                                                                                                                                                                                                                                            |                                |                                                                                                   |                                                                                                                                                                                                                                                                                                     |                                            |                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------|
| <b>Series</b><br><b>HB</b> Precision Snap-acting Switches                                                                                                                                                                                                                                                                                                                                  | <b>Function</b><br><b>S</b> SP | <b>Contact Separation</b><br><b>2</b> .020"<br><b>1</b> .010"<br><b>4</b> .040"<br><b>7</b> .070" | <b>Operating Force</b><br><b>KG</b> 18 oz./510 grams<br><b>GF</b> 4 oz./113 grams<br><b>KA</b> 9 oz./255 grams<br><b>KC</b> 13 oz./368 grams<br><b>KH</b> 20 oz./567 grams<br><b>PB</b> 26 oz./737 grams                                                                                            | <b>Mounting Style</b><br><b>S</b> Standard | <b>Circuitry</b><br><b>C</b> SPDT |
| <b>Electrical Rating</b><br><b>B4</b> 20 A, 125, 250, 480 V AC;<br>0.25 A, 250 V DC; 0.5 A, 125 V DC<br><b>A2</b> 5 A, 125, 250 V AC<br><b>B6</b> 20 A, 125, 250, 480 V AC; 0.25 A,<br>250 V DC; 0.5 A, 125 V DC; 3/4 HP,<br>125 V AC; 1 1/2 HP, 250 V AC<br><b>F5</b> 1 A, 125 V AC; 1 A, 30 V DC<br><b>F9</b> 22 A, 125, 277 V AC; 15 A, 480 V AC;<br>1/4 HP, 125 V AC; 1/2 HP, 250 V AC |                                |                                                                                                   | <b>Actuator</b><br><b>P0</b> Pin plunger<br><b>A0</b> Lever roller<br><b>D0</b> Stub plunger<br><b>F0</b> Reverse acting lever roller<br><b>J0</b> High overtravel plunger<br><b>R5</b> Perpendicular roller plunger<br><b>T0</b> Lever<br><b>TS</b> Sealed Lever<br><b>Y0</b> Reverse acting lever |                                            |                                   |
| <b>Terminations</b><br><b>11</b> Flat base, solder, 4-40 screws<br><b>41</b> Flat base, .250" quick connect<br><b>55</b> Step base, cup washers, 6-32 screws                                                                                                                                                                                                                               |                                |                                                                                                   |                                                                                                                                                                                                                                                                                                     |                                            |                                   |



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

## HB Series g Switches

## Sealed Actuator and Case

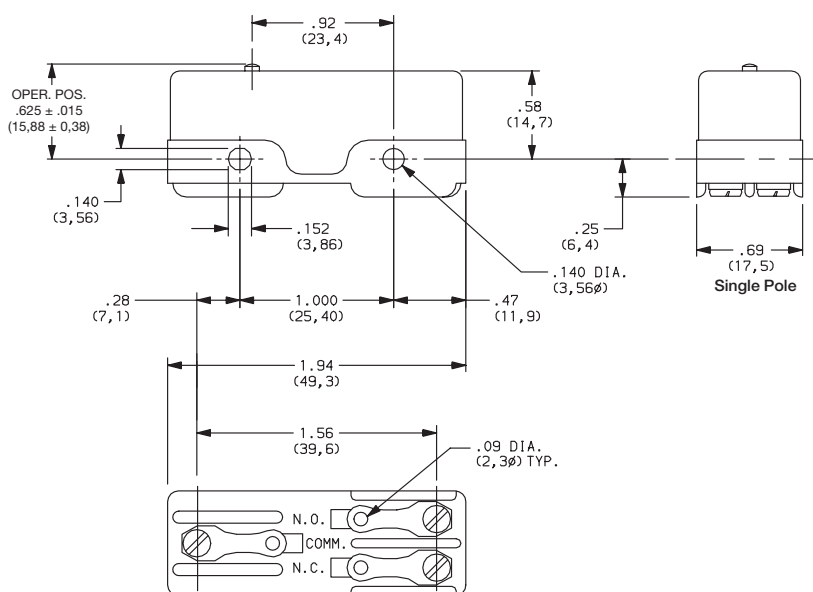
To provide reliable service under environmental conditions that might damage standard precision switches, various HB Series switch models are sealed against the entrance of airborne contaminants and/or splashing liquids. The clearance between the operating plunger and the cover is sealed with a silicone boot and the base cover joint is sealed with an epoxy adhesive. These models are designed to meet requirements of IP65 (dust proof, water splash and dew condensation). For additional information on sealed switches, consult our Customer Service Center.

**SERIES** 

**HB** PRECISION SNAP-ACTING SWITCHES

**FUNCTION** 

**S** SINGLE POLE SWITCH



**NOTE:** To select switching function, see CIRCUITRY section, page J-52.



J

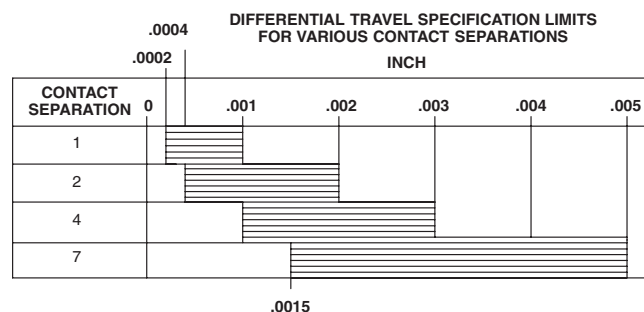
## Snap-acting

## CONTACT SEPARATION

| OPTION<br>CODE | NOMINAL CONTACT<br>SEPARATION (in./mm) |
|----------------|----------------------------------------|
| 2              | .020<br>(0,51)                         |
| 1              | .010<br>(0,25)                         |
| 4              | .040<br>(1,02)                         |
| 7              | .070<br>(1,78)                         |

Switches with 1 AMP rating (option code 'F5') are available only with .020 contact separation (option '2').

Switches with 1/2 HP, 125 V AC rating or greater (option codes 'B5 and B6') are not available with .010 contact separation (option code '1').



Dimensions are shown: Inch (mm)

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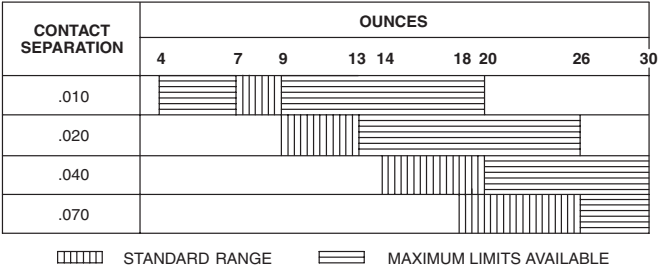
# HB Series

## Single Pole Standard Precision Snap-acting Switches

### OPERATING FORCE

| OPTION CODE | MAXIMUM OPERATING FORCE (OZ./GRAMS) | STANDARD CONTACT SEPARATION (inch) |
|-------------|-------------------------------------|------------------------------------|
| KG          | 18<br>510                           | .020                               |
| GF          | 4<br>115                            | .010                               |
| KA          | 9<br>255                            | .010                               |
| KC          | 13<br>370                           | .020                               |
| KH          | 20<br>570                           | .040                               |
| PB          | 26<br>740                           | .070                               |

OPERATING FORCE SPECIFICATION LIMITS  
FOR VARIOUS CONTACT SEPARATIONS



**NOTE:** All listed differential travel characteristics are based on standard operating force and contact separation. For any other force or contact separation, consult Customer Service Center.  
Operating force varies with actuator option, see ACTUATOR option section.

### ELECTRICAL RATING

| OPTION CODE | MOVABLE CONTACT       | STATIONARY CONTACT                 | ELECTRICAL RATING                                                                                                    |
|-------------|-----------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| B4          | Fine silver.          | Fine silver welded to copper base. | 20 AMPS @ 125, 250 & 480 V AC; 0.25 AMPS @ 250 V DC; 0.5 AMPS @ 125 V DC (UL).                                       |
| A2          |                       |                                    | 5 AMPS @ 125 & 250 V AC (UL).                                                                                        |
| B6          | Precious metal alloy. | Precious metal alloy.              | 20 AMPS @ 125, 250 & 480 V AC; 0.25 AMP @ 250 V DC; 0.5 AMP @ 125 V DC; 3/4 HP @ 125 V AC; 1 1/2 HP @ 250 V AC (UL). |
| F5          | Gold alloy.           | Gold alloy.                        | Low level* to 1 AMP @ 125 V AC; 1 AMP @ 30 V DC (UL).                                                                |
| F9          | Fine silver.          | Fine silver welded to copper base. | 22 AMPS @ 125 & 277 V AC; 15 AMPS @ 480 V AC; 1/4 HP @ 125 V AC; 1/2 HP @ 250 V AC; 277 V AC (UL).                   |

\* Note: See Technical Data section of this catalog for RoHS compliant and compatible definition and specifications.

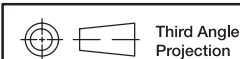
### AVAILABLE COMBINATIONS

| ELECTRICAL RATING | OPERATING FORCE (oz.) |      |       |       |       |       |
|-------------------|-----------------------|------|-------|-------|-------|-------|
|                   | 4 GF                  | 9 KA | 13 KC | 18 KG | 20 KH | 26 PB |
| A2                | •                     | •    | •     | •     | •     | •     |
| B4                | x                     | •    | •     | •     | •     | •     |
| B6                | x                     | x    | x     | •     | •     | •     |
| F5                | x                     | x    | •     | •     | •     | •     |
| F9                | x                     | x    | x     | •     | •     | •     |

• AVAILABLE  
x NOT AVAILABLE

All models with all options  
Consult Customer Service center for availability and delivery of nonstandard ratings.

\* Low Level=conditions where no arcing occurs during switching,  
i.e., 0.4 VA max. @ 20 V AC or DC max.



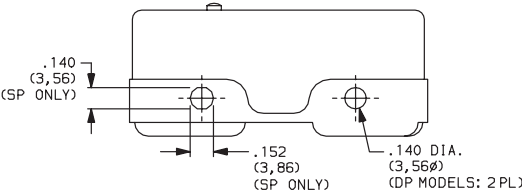
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# HB Series Single Pole Standard Precision Snap-acting Switches

## MOUNTING STYLE

**S** Standard

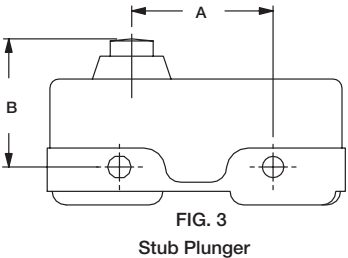
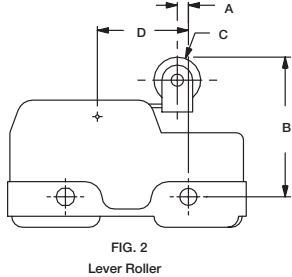
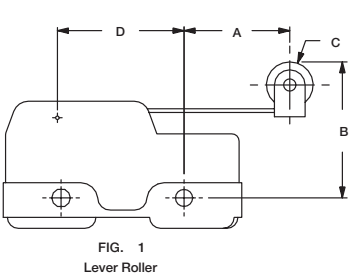


**NOTE:** Mounting holes will accept pins or screws of .139 dia. (3,53) max. on 1.000 ± .002 (25,4 ± 0,05) centers.

**NOTE:** Torque mounting screws 3 inlbs max.

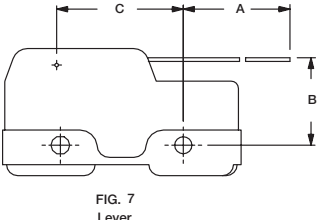
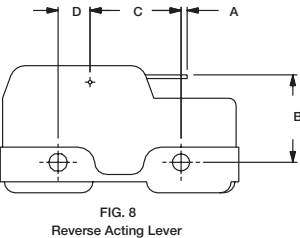
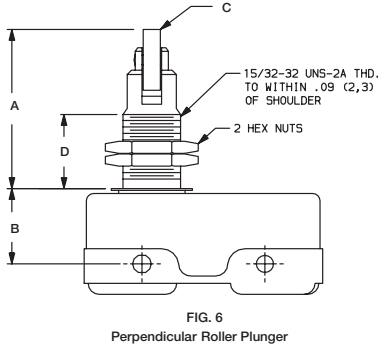
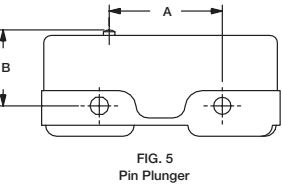
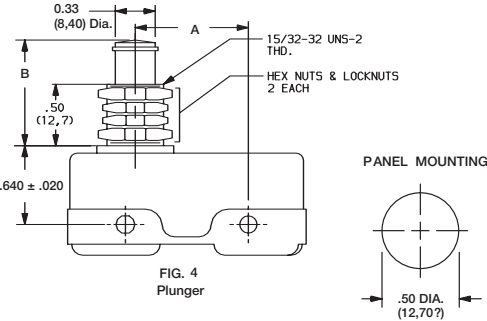
## ACTUATOR

| OPTION CODE | NO. POLES | FIG. | DIM. A           | DIM. B                         | DIM. C               | DIM. D         |
|-------------|-----------|------|------------------|--------------------------------|----------------------|----------------|
| <b>A0</b>   | SP        | 1    | .86<br>(21,8)    | 1.120 ± .060<br>(28,45 ± 1,52) | .38 dia.<br>(9,70)   | 1.03<br>(26,2) |
| <b>D0</b>   | SP        | 3    | .92<br>(23,4)    | .844 ± .020<br>(21,44 ± 0,51)  | —                    | —              |
| <b>F0</b>   | SP        | 2    | .09<br>(2,3)     | 1.120 ± .050<br>(28,45 ± 1,27) | .38 dia.<br>(9,70)   | .74<br>(18,8)  |
| <b>J0</b>   | SP        | 4    | .86<br>(21,8)    | .860 ± .030<br>(21,84 ± 0,76)  | —                    | —              |
| <b>P0</b>   | SP        | 5    | .92<br>(23,4)    | .625 ± .010<br>(15,88 ± 0,25)  | —                    | —              |
| <b>R5</b>   | SP        | 6    | .92<br>(23,4)    | .62<br>(15,7)                  | .50 dia.<br>(12,70)  | 0.61<br>(15,5) |
| <b>T0</b>   | SP        | 7    | 1.310<br>(33,27) | .720 ± .060<br>(18,28 ± 1,52)  | 1.03 dia.<br>(26,20) | —              |
| <b>TS*</b>  | SP        | 7    | 1.47<br>(37,3)   | .720 ± .060<br>(18,28 ± 1,52)  | 1.03 dia.<br>(26,20) | —              |
| <b>Y0</b>   | SP        | 8    | .05<br>(1,3)     | .720 ± .030<br>(18,29 ± 0,76)  | .74 dia.<br>(18,80)  | 2.65<br>(6,73) |



Snap-acting

\* Actuators sealed against the entrance of airborne contaminants and/or splashing liquids.



Dimensions are shown: Inch (mm)  
Specifications and dimensions subject to change



HB Series  
Single Pole Standard Precision Snap-acting Switches

ACTUATOR

|                                              | OPTION<br>CODE | ACTUATOR   |            |           |           |           |           |            |           | * SEALED ACTUATOR |
|----------------------------------------------|----------------|------------|------------|-----------|-----------|-----------|-----------|------------|-----------|-------------------|
|                                              |                | A0         | D0         | F0        | J0        | P0        | R5        | T0         | Y0        | TS                |
| MAXIMUM<br>OPERATING<br>FORCE<br>(OZ./GRAMS) | GF             | —          | —          | —         | —         | 4<br>115  | —         | —          | —         | —                 |
|                                              | KA             | 3<br>85    | 9.5<br>269 | 10<br>284 | 10<br>284 | 9<br>255  | 10<br>284 | 2<br>60    | 10<br>284 | 2<br>56           |
|                                              | KC             | —          | 13<br>370  | 10<br>284 | 13<br>370 | 13<br>370 | 13<br>370 | —          | 10<br>284 | —                 |
|                                              | KG             | 3.5<br>100 | —          | —         | —         | 18<br>510 | —         | 2.5<br>71  | —         | 2.5<br>71         |
|                                              | KH             | 4<br>115   | 20<br>570  | 20<br>570 | 20<br>570 | 20<br>570 | 20<br>570 | 3<br>85    | 20<br>570 | 3<br>85           |
|                                              | PB             | 4.5<br>130 | 26<br>740  | 20<br>570 | 26<br>740 | 26<br>740 | 26<br>740 | 3.5<br>100 | 20<br>570 | 3.5<br>100        |
| MINIMUM<br>RELEASE<br>FORCE<br>(OZ./GRAMS)   | GF             | —          | —          | —         | —         | 1<br>28   | —         | —          | —         | —                 |
|                                              | KA             | .75<br>21  | 4<br>110   | 3<br>85   | 4<br>110  | 4<br>110  | 4<br>110  | .5<br>14   | 3<br>85   | .5<br>14          |
|                                              | KC             | 1.7<br>48  | 4<br>110   | 3<br>85   | 4<br>110  | 4<br>110  | 4<br>110  | —          | 3<br>85   | —                 |
|                                              | KG             | .75<br>21  | —          | —         | —         | 4<br>110  | —         | .5<br>14   | —         | .5<br>14          |
|                                              | KH             | .75<br>21  | 4<br>110   | 3<br>85   | 4<br>110  | 4<br>110  | 4<br>110  | .5<br>14   | 3<br>85   | .5<br>14          |
|                                              | PB             | .75<br>21  | 4<br>110   | 3<br>85   | 4<br>110  | 4<br>110  | 4<br>110  | .5<br>14   | 3<br>85   | .5<br>14          |

NOTE: For basic switch operating forces, see page J-51. \* Actuators sealed against the entrance of airborne contaminants and/or splashing liquids.

|                                              | OPTION<br>CODE | ACTUATOR       |                  |                |                |                  |                |                |                | * SEALED ACTUATOR |
|----------------------------------------------|----------------|----------------|------------------|----------------|----------------|------------------|----------------|----------------|----------------|-------------------|
|                                              |                | A0             | D0               | F0             | J0             | P0               | R5             | T0             | Y0             | TS                |
| MAXIMUM<br>DIFFERENTIAL<br>TRAVEL<br>(IN/MM) | GF             | —              | —                | —              | —              | .0005<br>(0,013) | —              | —              | —              | —                 |
|                                              | KA             | .020<br>(0,51) | .0005<br>(0,013) | .005<br>(0,13) | —              | .0005<br>(0,013) | —              | .047<br>(1,19) | .005<br>(0,13) | .047<br>(1,19)    |
|                                              | KC             | —              | .002<br>(0,05)   | .008<br>(0,20) | —              | .002<br>(0,05)   | —              | —              | .009<br>(0,23) | —                 |
|                                              | KG             | .062<br>(1,57) | —                | —              | —              | .003<br>(0,08)   | —              | .078<br>(1,98) | —              | .078<br>(1,98)    |
|                                              | KH             | .080<br>(2,03) | .003<br>(0,76)   | .020<br>(0,51) | —              | .003<br>(0,08)   | —              | .093<br>(2,36) | .020<br>(0,51) | .093<br>(2,36)    |
|                                              | PB             | .125<br>(3,18) | .007<br>(0,18)   | .030<br>(0,76) | —              | .005<br>(0,13)   | —              | .156<br>(3,96) | .031<br>(0,79) | .156<br>(3,96)    |
| MAXIMUM<br>PRETRAVEL<br>(IN/MM)              | GF             | —              | —                | —              | —              | .020<br>(0,51)   | —              | —              | —              | —                 |
|                                              | KA             | .312<br>(7,92) | .020<br>(0,51)   | 0.8<br>(2,0)   | .015<br>(0,38) | .015<br>(0,38)   | .015<br>(0,38) | .38<br>(9,7)   | .09<br>(2,3)   | .38<br>(9,7)      |
|                                              | KC             | —              | .020<br>(0,51)   | 0.8<br>(2,0)   | .020<br>(0,51) | .020<br>(0,51)   | .020<br>(0,51) | —              | .09<br>(2,3)   | —                 |
|                                              | KG             | .312<br>(7,92) | —                | —              | —              | .025<br>(0,64)   | —              | .38<br>(9,7)   | —              | .38<br>(9,7)      |
|                                              | KH             | .38<br>(9,7)   | .025<br>(0,64)   | 0.9<br>(2,3)   | .025<br>(0,64) | .025<br>(0,64)   | .025<br>(0,64) | .38<br>(9,7)   | 0.9<br>(2,3)   | .38<br>(9,7)      |
|                                              | PB             | .38<br>(9,7)   | .030<br>(0,76)   | 0.9<br>(2,3)   | .030<br>(0,76) | .030<br>(0,76)   | .030<br>(0,76) | .38<br>(9,7)   | 0.9<br>(2,3)   | .38<br>(9,7)      |
| MINIMUM<br>OVERTRAVEL<br>(IN/MM)             | GF             | —              | —                | —              | —              | .005<br>(0,13)   | —              | —              | —              | —                 |
|                                              | KA             | .156<br>(3,96) | .055<br>(1,40)   | .06<br>(1,5)   | .22<br>(5,6)   | .005<br>(0,13)   | .141<br>(3,58) | .19<br>(4,8)   | .06<br>(1,5)   | .19<br>(4,8)      |
|                                              | KC             | —              | .055<br>(1,40)   | 0.9<br>(2,3)   | .22<br>(5,6)   | .005<br>(0,13)   | .141<br>(3,58) | —              | 0.9<br>(2,3)   | —                 |
|                                              | KG             | .156<br>(3,96) | —                | —              | —              | .005<br>(0,13)   | —              | .19<br>(4,8)   | —              | .19<br>(4,8)      |
|                                              | KH             | .156<br>(3,96) | .055<br>(1,40)   | 0.9<br>(2,3)   | .22<br>(5,6)   | .005<br>(0,13)   | .141<br>(3,58) | .19<br>(4,8)   | 0.9<br>(2,3)   | .19<br>(4,8)      |
|                                              | PB             | .156<br>(3,96) | .055<br>(1,40)   | 0.9<br>(2,3)   | .22<br>(5,6)   | .005<br>(0,13)   | .141<br>(3,58) | .19<br>(4,8)   | 0.9<br>(2,3)   | .19<br>(4,8)      |



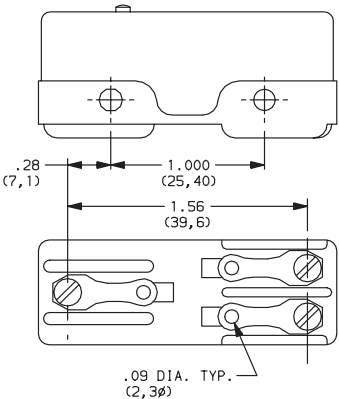
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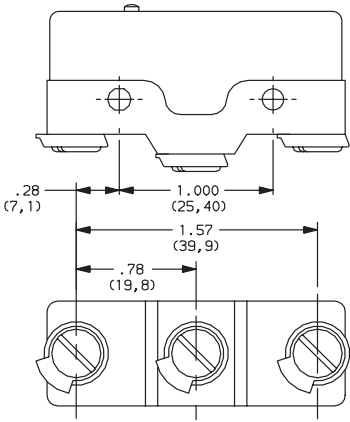
### TERMINATIONS

#### 11 FLAT BASE, SOLDER TERMINALS AND 4-40 SCREWS



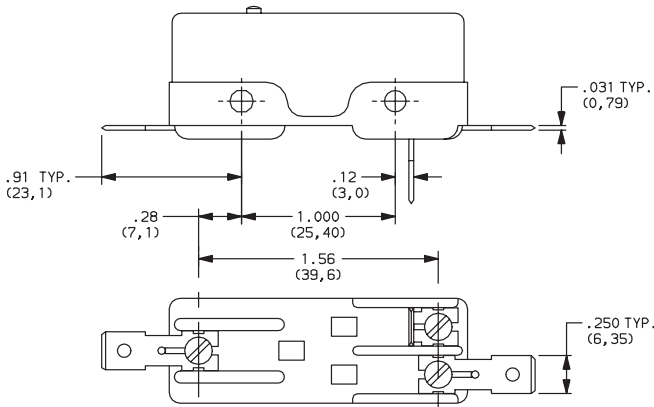
**NOTE:** Switches with flat base option have molded ribs that provide increased creep distance.

#### 55 STEP BASE, 6-32 SCREWS AND CUP WASHERS



**NOTE:** Switches with step base option provide wide electrical clearance for screw terminal options.

#### 41 FLAT BASE, .250" QUICK CONNECT TERMINALS



Snap-acting

### CIRCUITRY

#### C DT (Double Throw, Normally Closed & Normally Open)



Dimensions are shown: Inch (mm)

Specifications and dimensions subject to change

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