

# C&K 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 Ω 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 cadmium oxide 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 cadmium oxide inlay 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-24 thru J-29. For additional options not shown in catalog, consult Customer Service Center.

<p>Series</p> <p><b>HB</b> (STD.) Precision Snap-acting Switches</p>	<p>Operating Force</p> <p><b>KG</b> (STD.) 18 oz./510 grams</p> <p><b>GF</b> 4 oz./113 grams</p> <p><b>KA</b> 9 oz./255 grams</p> <p><b>KC</b> 13 oz./368 grams</p> <p><b>KH</b> 20 oz./567 grams</p> <p><b>PB</b> 26 oz./737 grams</p>	<p>Mounting Style</p> <p><b>S</b> (STD.)</p>
<p>Function</p> <p><b>S</b> (STD.) SP</p>	<p>Electrical Rating</p> <p><b>B4</b> (STD.) 20 A, 125, 250, 480 V AC; 0.25 A, 250 V DC; 0.5 A, 125 V DC</p> <p><b>A2</b> 5 A, 125, 250 V AC</p> <p><b>A4</b> 15 A, 125, 250 V AC</p> <p><b>B5</b> 20 A, 125, 250, 480 V AC; 0.25 A, 250 V DC; 0.5 A, 125 V DC; 1/2 HP, 125 V AC; 1 HP, 250 V AC</p> <p><b>B6</b> 20 A, 125, 250, 480 V AC; 0.25 A, 250 V DC; 0.5 A, 125 V DC; 3/4 HP, 125 V AC; 1 1/2 HP, 250 V AC</p> <p><b>B9</b> 15 A, 125, 250 V AC; 1/4 HP, 125 V AC; 1/2 HP, 250 V AC</p> <p><b>F5</b> 1 A, 125 V AC; 1 A, 30 V DC</p> <p><b>F9</b> 22 A, 125, 277 V AC; 15 A, 480 V AC; 1/4 HP, 125 V AC; 1/2 HP, 250 V AC</p> <p><b>X3</b> 20 A, 125, 250, 480 V AC; 0.25 A, 250 V DC; 0.5 A, 125 V DC; 15(10) A, 380 V- 185 μ (VDE)</p>	<p>Actuator</p> <p><b>P0</b> (STD.) Pin plunger</p> <p><b>A0</b> Lever roller</p> <p><b>D0</b> Stub plunger</p> <p><b>F0</b> Reverse acting lever roller</p> <p><b>J0</b> High overtravel plunger</p> <p><b>R5</b> Perpendicular roller plunger</p> <p><b>T0</b> Lever</p> <p><b>TS</b> Sealed Lever</p> <p><b>Y0</b> Reverse acting lever</p>
<p>Contact Separation</p> <p><b>2</b> (STD.) .020"</p> <p><b>1</b> .010"</p> <p><b>4</b> .040"</p> <p><b>7</b> .070"</p>	<p>Terminations</p> <p><b>11</b> (STD.) Flat base, solder, 4-40 screws</p> <p><b>01</b> Flat base, 4-40 thread</p> <p><b>05</b> Step base, 6-32 thread</p> <p><b>41</b> Flat base, .250" quick connect</p> <p><b>45</b> Step base, cup washers, 6-32 screws</p> <p><b>55</b> Step base, 6-32 screws, lockwashers</p>	<p>Circuitry</p> <p><b>C</b> (STD.) DT</p> <p><b>W</b> ST N.C.</p> <p><b>V</b> ST N.O.</p>
<p>Electrical Life</p> <p><b>NONE</b> (STD.) 6,000 operations</p> <p><b>U</b> 100,000 operations</p>		

# C&K HB Series Single Pole Standard Precision Snap-acting 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.

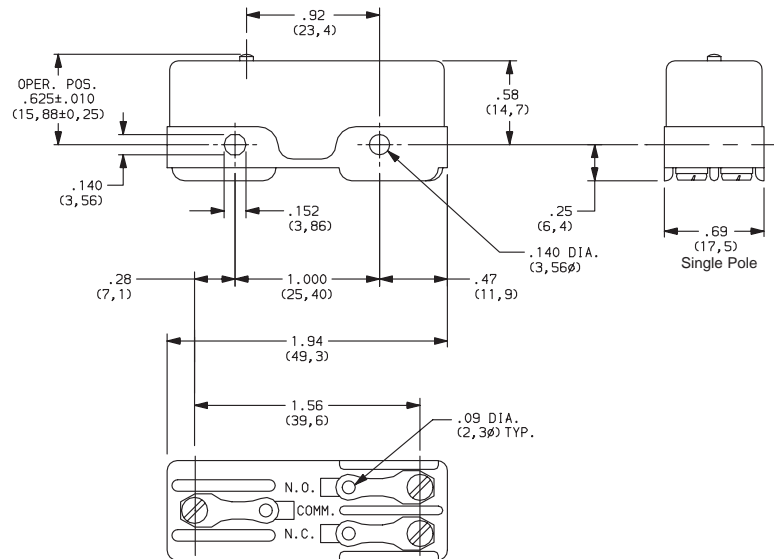
## SERIES

**HB** (STD.) PRECISION SNAP-ACTING SWITCHES

## FUNCTION

**S** (STD.) SINGLE POLE SWITCH

Snap-acting

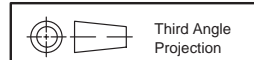
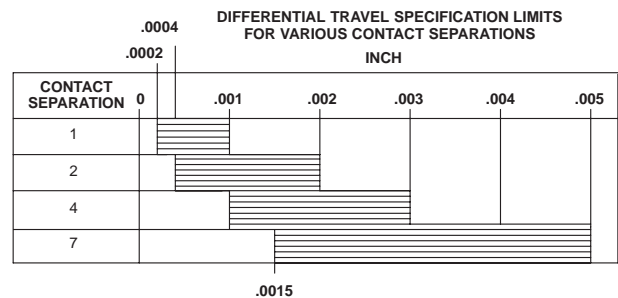


NOTE: To select switching function, see CIRCUITRY section, page J-29.

## CONTACT SEPARATION

OPTION CODE	NOMINAL CONTACT SEPARATION (in./mm)
<b>2</b> (STD.)	.020 (0,51)
<b>1</b>	.010 (0,25)
<b>4</b>	.040 (1,02)
<b>7</b>	.070 (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').



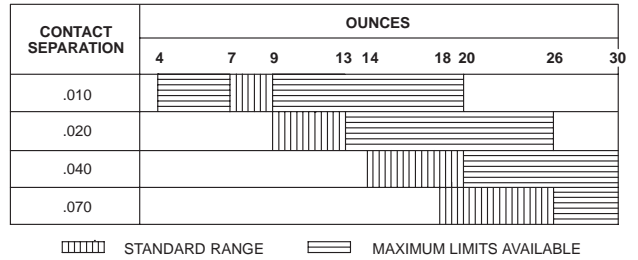
Dimensions are shown: IN (mm)  
Dimensions subject to change

# C&K HB Series Single Pole Standard Precision Snap-acting Switches

## OPERATING FORCE

OPTION CODE	MAXIMUM OPERATING FORCE (OZ./GRAMS)	STANDARD CONTACT SEPARATION (inch)
<b>KG (STD.)</b>	18 510	.020
<b>GF</b>	4 115	.010
<b>KA</b>	9 255	.010
<b>KC</b>	13 370	.020
<b>KH</b>	20 570	.040
<b>PB</b>	26 740	.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
<b>B4 (STD.)</b>	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/CSA).
<b>A2</b>			5 AMPS @ 125 & 250 V AC (UL/CSA).
<b>A4</b>			15 AMPS @ 125 & 250 V AC
<b>B5</b>	Silver cadmium oxide.	Silver cadmium oxide on copper base.	20 AMPS @ 125, 250 & 480 V AC; 0.25 AMPS @ 250 V DC; 0.5 AMPS @ 125 V DC; 1/2 HP @ 125 V AC; 1 HP @ 250 V AC (UL/CSA).
<b>B6</b>			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/CSA).
<b>B9</b>	Fine silver.	Fine silver welded to copper base.	15 AMPS @ 125 & 250 V AC; 1/4 HP @ 125 V AC; 1/2 HP @ 250 V AC (UL/CSA).
<b>F5</b>	Gold alloy.	Gold alloy.	Low level* to 1 AMP @ 125 V AC; 1 AMP @ 30 V DC (UL/CSA).
<b>F9</b>	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/CSA).
<b>X3</b>	Fine silver.	Fine silver welded to copper base.	20 AMPS @ 125, 250, 480 V AC; 0.25 AMP @ 250 V DC, 0.5 AMP @ 125 V DC (UL/CSA); 15 (10) AMPS @ 380 V - T85 50E3 m (VDE).

Snap-acting

### AVAILABLE COMBINATIONS

EUROPEAN SYMBOLS	
m	Microgap construction (less than 4 mm).
~	Alternating current.
T__	Maximum rated use temperature.
50E3	Cycles over 50,000 at rated current.
10(3)	First number represents resistive rating; second number represents inductive (motor) rating.

ELECTRICAL RATING	OPERATING FORCE (oz.)					
	4	9	13	18	20	26
A2	•	•	•	•	•	•
A4	x	•	•	•	•	x
B4	x	•	•	•	•	•
B5	x	x	•	•	•	•
B6	x	x	x	•	•	•
B9	x	•	•	•	•	•
F5	x	x	•	•	•	•
F9	x	x	x	•	•	•
X3	x	•	•	•	•	•

• AVAILABLE  
x NOT AVAILABLE

All models with all options, also available.

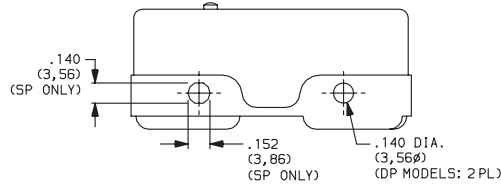
Consult Customer Service center for availability and delivery of nonstandard ratings.

\* 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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## MOUNTING STYLE

S (STD.)



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
A0	SP	1	.86 (21,8)	1.120 ± .060 (28,45 ± 1,52)	.38 dia. (9,7Ø)	1.03 (26,2)
D0	SP	3	.92 (23,4)	.844 ± .020 (21,44 ± 0,51)	—	—
F0	SP	2	.09 (2,3)	1.120 ± .050 (28,45 ± 1,27)	.38 dia. (9,7Ø)	.74 (18,8)

OPTION CODE	NO. POLES	FIG.	DIM. A	DIM. B	DIM. C	DIM. D
J0	SP	4	.92 (23,4)	.860 ± .030 (21,84 ± 0,76)	.64 (16,3)	.33 dia. (8,4Ø)
P0 (STD.)	SP	5	.92 (23,4)	.625 ± .010 (15,88 ± 0,25)	—	—

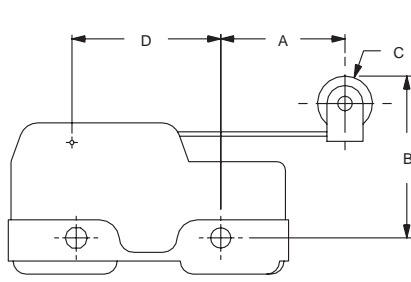


FIG. 1  
Lever Roller

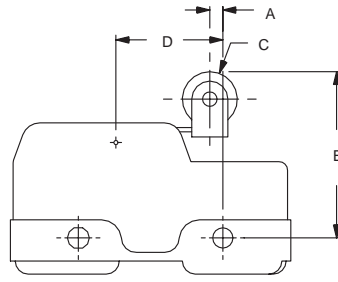


FIG. 2  
Lever Roller

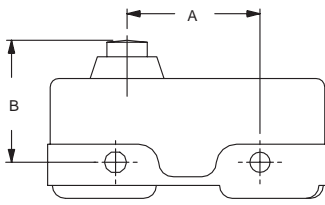


FIG. 3  
Stub Plunger

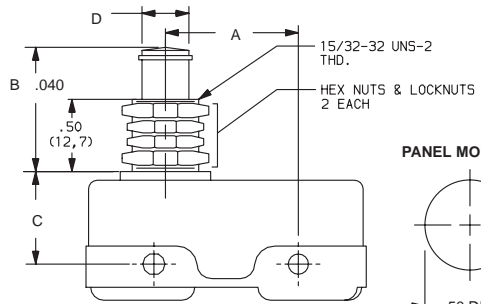


FIG. 4  
Plunger

PANEL MOUNTING

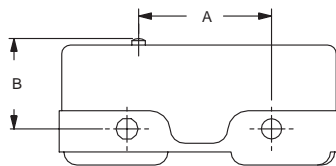
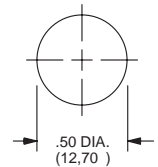


FIG. 5  
Pin Plunger

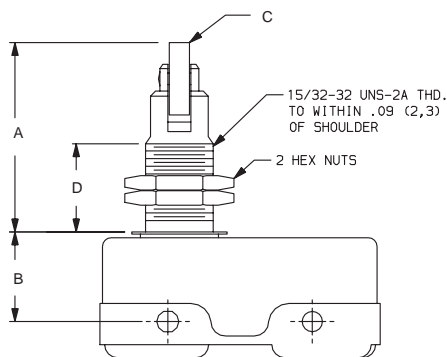
Snap-acting

# C&K HB Series Single Pole Standard Precision Snap-acting Switches

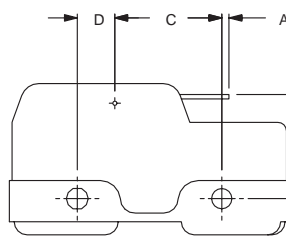
## ACTUATOR

OPTION CODE	NO. POLES	FIG.	DIM. A	DIM. B	DIM. C	DIM. D
R5	SP	6	1.310 (33,27)	.62 (15,7)	.50 dia. (12,7Ø)	.61 (15,5)
T0	SP	7	1.47 (37,3)	.720 ± .060 (18,28 ± 1,52)	1.03 (26,2)	—
TS*	SP	7	1.47 (37,3)	.720 ± .060 (18,28 ± 1,52)	1.03 (26,2)	—
Y0	SP	8	.05 (1,3)	.720 ± .030 (18,29 ± 0,76)	.74 (18,8)	.265 (6,73)

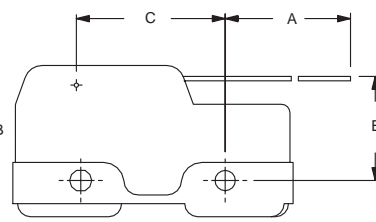
\* Actuators sealed against the entrance of airborne contaminants and/or splashing liquids.



**FIG. 6**  
Perpendicular Roller Plunger



**FIG. 7**  
Reverse Acting Lever



**FIG. 8**  
Lever

	OPTION CODE	ACTUATOR								* SEALED ACTUATOR
		A0	D0	F0	J0	P0	R5	T0	Y0	TS
MAXIMUM OPERATING FORCE (OZ./GRAMS)	G4	—	—	—	—	4 115	—	—	—	—
	KA	3 85	9.5 269	10 284	10 284	9 255	10 284	2 60	10 284	2 56
	KC	—	13 370	10 284	13 370	13 370	13 370	—	10 284	—
	KG	3.5 100	—	—	—	18 510	—	2.5 71	—	2.5 71
	KH	4 115	20 570	20 570	20 570	20 570	20 570	3 85	20 570	3 85
	PB	4.5 130	26 740	20 570	26 740	26 740	26 740	3.5 100	20 570	3.5 100
MAXIMUM RELEASE FORCE (OZ./GRAMS)	G4	—	—	—	—	1 28	—	—	—	—
	KA	.75 21	4 110	3 85	4 110	4 110	4 110	.5 14	3 85	.5 14
	KC	—	4 110	3 85	4 110	4 110	4 110	—	3 85	—
	KG	.75 21	—	—	—	4 110	—	.5 14	—	.5 14
	KH	.75 21	4 110	3 85	4 110	4 110	4 110	.5 14	3 85	.5 14
	PB	.75 21	4 110	3 85	4 110	4 110	4 110	.5 14	3 85	.5 14

NOTE: For basic switch operating forces, see page J-25.

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

# C&K HB Series Single Pole Standard Precision Snap-acting Switches

## ACTUATOR

	OPTION CODE	ACTUATOR								* SEALED ACTUATOR
		A0	D0	F0	J0	P0	R5	T0	Y0	TS
MAXIMUM DIFFERENTIAL TRAVEL (IN/MM)	G4	—	—	—	—	.0005 (0,013)	—	—	—	—
	KA	.020 (0,51)	.0005 (0,013)	.005 (0,13)	—	.0005 (0,013)	—	.047 (1,19)	.005 (0,13)	.047 (1,19)
	KC	—	.002 (0,05)	.008 (0,20)	—	.002 (0,05)	—	—	.009 (0,23)	—
	KG	.062 (1,57)	—	—	—	.003 (0,08)	—	.078 (1,98)	—	.078 (1,98)
	KH	.080 (2,03)	.003 (0,076)	.020 (0,51)	—	.003 (0,08)	—	.093 (2,36)	.020 (0,51)	.093 (2,36)
	PB	.125 (3,18)	.007 (0,18)	.030 (0,76)	—	.005 (0,13)	—	.156 (3,96)	.031 (0,79)	.156 (3,96)
MAXIMUM PRETRAVEL (IN/MM)	G4	—	—	—	—	.020 (0,51)	—	—	—	—
	KA	.312 (7,92)	.020 (0,51)	0.8 (2,0)	.015 (0,38)	.015 (0,38)	.015 (0,38)	.38 (9,7)	.09 (2,3)	.38 (9,7)
	KC	—	.020 (0,51)	0.8 (2,0)	.020 (0,51)	.020 (0,51)	.020 (0,51)	—	.09 (2,3)	—
	KG	.312 (7,92)	—	—	—	.025 (0,64)	—	.38 (9,7)	—	.38 (9,7)
	KH	.38 (9,7)	.025 (0,64)	0.9 (2,3)	.025 (0,64)	.025 (0,64)	.025 (0,64)	.38 (9,7)	0.9 (2,3)	.38 (9,7)
	PB	.38 (9,7)	.030 (0,76)	0.9 (2,3)	.030 (0,76)	.030 (0,76)	.030 (0,76)	.38 (9,7)	0.9 (2,3)	.38 (9,7)
MINIMUM OVERTRAVEL (IN/MM)	G4	—	—	—	—	.005 (0,13)	—	—	—	—
	KA	.156 (3,96)	.055 (1,40)	.06 (1,5)	.22 (5,6)	.005 (0,13)	.141 (3,58)	.19 (4,8)	.06 (1,5)	.19 (4,8)
	KC	—	.055 (1,40)	0.9 (2,3)	.22 (5,6)	.005 (0,13)	.141 (3,58)	—	0.9 (2,3)	—
	KG	.156 (3,96)	—	—	—	.005 (0,13)	—	.19 (4,8)	—	.19 (4,8)
	KH	.156 (3,96)	.055 (1,40)	0.9 (2,3)	.22 (5,6)	.005 (0,13)	.141 (3,58)	.19 (4,8)	0.9 (2,3)	.19 (4,8)
	PB	.156 (3,96)	.055 (1,40)	0.9 (2,3)	.22 (5,6)	.005 (0,13)	.141 (3,58)	.19 (4,8)	0.9 (2,3)	.19 (4,8)

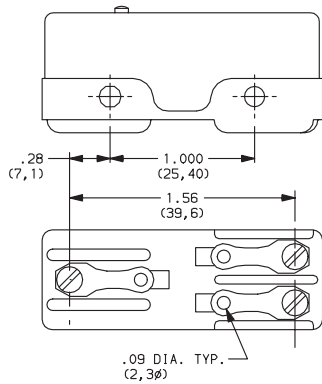
NOTE: For basic switch operating forces, see page J-25.

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

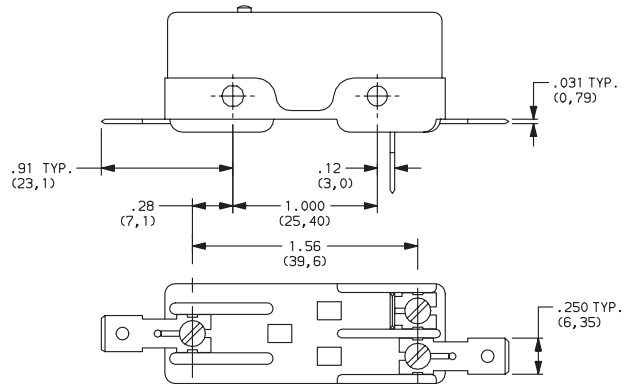
Snap-acting

## TERMINATIONS

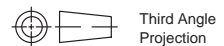
- 11 (STD.) FLAT BASE, SOLDER TERMINALS AND 4-40 SCREWS
- 01 FLAT BASE, NO TERMINALS OR SCREWS, 4-40 THREAD



- 41 FLAT BASE, .250" QUICK CONNECT TERMINALS



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

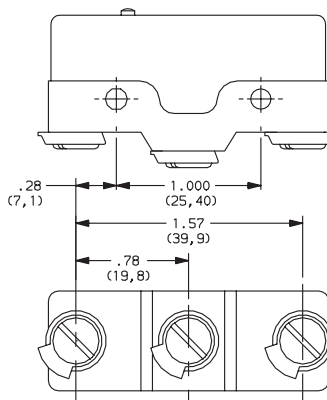


Dimensions are shown: IN (mm)  
Dimensions subject to change

# C&K HB Series Single Pole Standard Precision Snap-acting Switches

## TERMINATIONS

- 05** STEP BASE, NO SCREWS OR CUP WASHERS, 6-32 THREAD
- 55** STEP BASE, 6-32 SCREWS AND CUP WASHERS
- 65** STEP BASE, 6-32 SCREWS AND INTERNAL TOOTH LOCKWASHERS



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

## CIRCUITRY

- C** (STD.) DT (Double Throw, Normally Closed & Normally Open)
- W** ST N.C. (Single Throw, Normally Closed)
- Y** ST N.O. (Single Throw, Normally Open)

## ELECTRICAL LIFE

- NONE** (STD.) 6,000 OPERATIONS
- U** EXTENDED 100,000 OPERATIONS

Standard electrical life per UL 1054, rated for 6,000 operations.

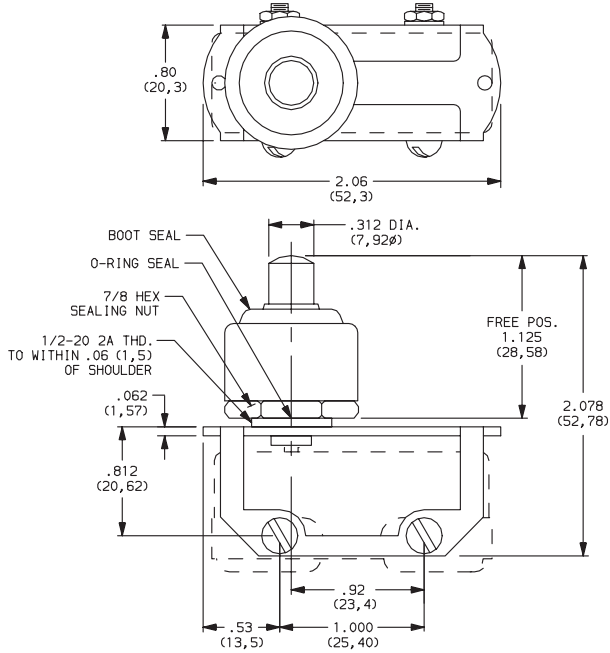
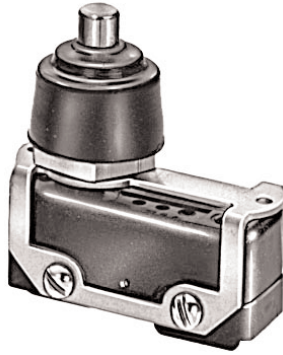
Extended electrical life per UL 1054, rated for 100,000 operations.

# C&K HB Series Single Pole Standard Precision Snap-acting Switches

## AVAILABLE HARDWARE

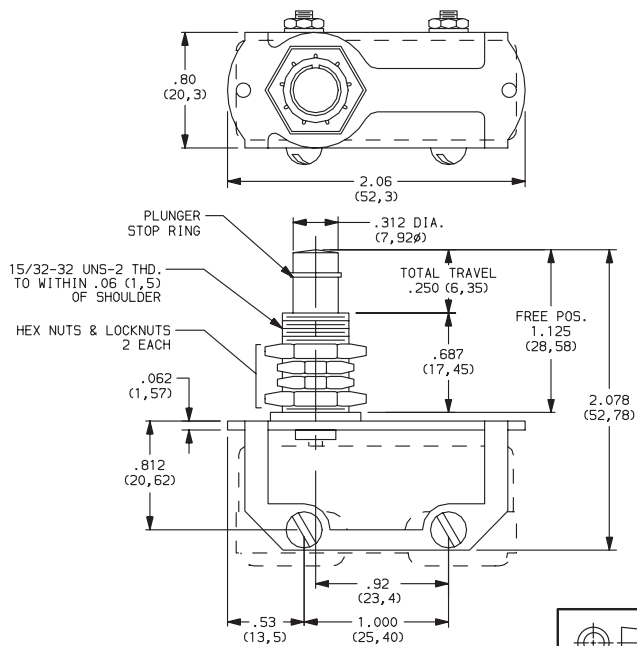
Basic precision HB Series switches, with any terminal style, can be used with these attachable actuators. As supplied, the actuator is not assembled to the switch; the switch must be ordered separately. The actuator can be assembled to the switch before mounting, or the actuator can be mounted on the panel or chassis and the switch installed after wiring. Assembly screws, nuts and lockwashers are furnished.

### BB-1 SEALED PLUNGER (For use with P0 actuator option.)



Actuator assembly sealed to mounting surface by flexible boot and o-ring seal.

### BJ-1 OVERTRAVEL PLUNGER (For use with P0 actuator option.)



Provides up to .250 in. total travel; mounting by threaded bushing or two screws.



Third Angle Projection  
Dimensions are shown: IN (mm)  
Dimensions subject to change

Snap-acting

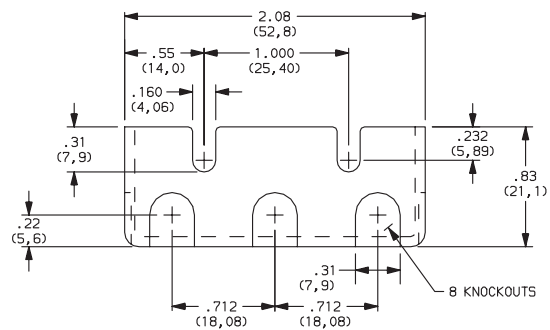
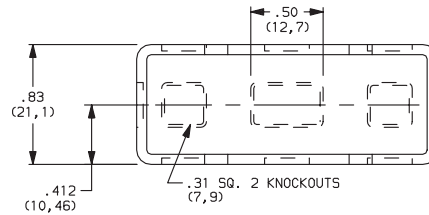


# C&K HB Series Single Pole Standard Precision Snap-acting Switches

## AVAILABLE HARDWARE

These terminal covers are available with HB Series switches. They are made of molded phenolic, with knockouts that permit wires to be brought in at convenient points. They are held in place by the switch mounting screws.

### TC-1



Snap-acting