



Wiping Contact Pushbutton Switches

SERIES 10 SERIES 4000 SPST, 1 and 3 Amp

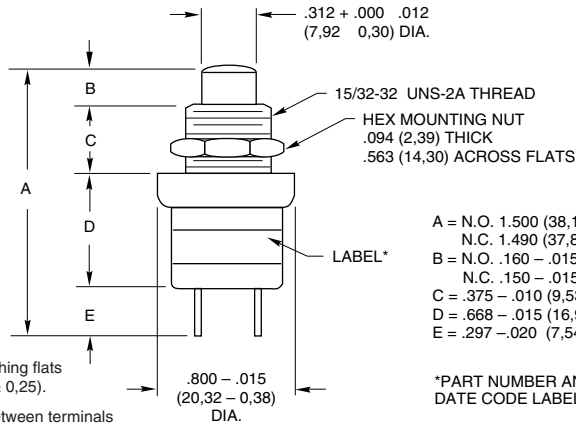
FEATURES

- Momentary or Momentary With Positive Feel
- UL Recognized at 3 Amps



DIMENSIONS in Inches (and millimeters)

4001(UL)
10-09 (UL)
10-100
4002 (UL)
10-10 (UL)
10-101



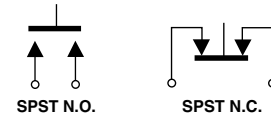
Dimension across bushing flats is $.406 \pm .010$ (10,31 \pm 0,25).
The inside distance between terminals is $.359$ (9,12) at the switch base.

A = N.O. 1.500 (38,1) REF.
N.C. 1.490 (37,8) REF.
B = N.O. .160 - .015 (4,06 - 0,38)
N.C. .150 - .015 (3,81 - 0,38)
C = .375 - .010 (9,53 - 0,25)
D = .668 - .015 (16,97 - 0,38)
E = .297 - .020 (7,54 - 0,51)

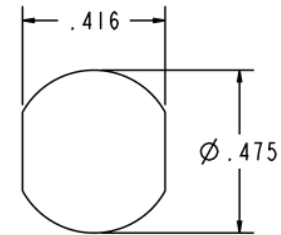
*PART NUMBER AND E.I.A. DATE CODE LABEL

Action	Part No.	Circuitry	Oper. at Rated Load	Rating at 115 Vac Resistive	Rating at 220 Vac Resistive	Actuating Force
Momentary	4001 10-09	SPST-N.O.	100,000	1 Amp	1/2 Amp	22 oz. \pm 8
Momentary	4002 10-10	SPST-N.C.	100,000	1 Amp	1/2 Amp	23 oz. \pm 7
Pos. Feel	10-100	SPST-N.O.	100,000	1 Amp	1/2 Amp	35 oz. \pm 8
Pos. Feel	10-101	SPST-N.C.	100,000	1 Amp	1/2 Amp	35 oz. \pm 10
Underwriters Laboratory Recognized						
Momentary	4001 UL 10-09 UL	SPST-N.O.	6,000	3 Amp	—	22 oz. \pm 8
Momentary	4002 UL 10-10 UL	SPST-N.C.	6,000	3 Amp	—	23 oz. \pm 7

CIRCUITRY



RECOMMENDED PANEL CUTOUT



ACCESSORIES



Decorative Mounting Nut
Part No. 07C1040-1



Button Guard
Part No. 10C1015-1

SPECIFICATIONS

Rating Criteria

Rated: See chart above

Contact Resistance: 25 milliohms or less on a new switch

Voltage Breakdown: 1,000 Vac between mutually insulated parts

Insulation Resistance: 1,000 megohms minimum

Additional Characteristics

Total Travel: Normally open $.140 \pm .032$ (3,56 \pm 0,81). Normally closed $.110 + .010 / - .020$ (2,79 + 0,25 / - 0,51).

Overtravel: Normally open $.020$ (0,51) min.

Pretravel: Normally closed $.010$ (0,25) min.

Operating Temperature: -40°C to $+85^{\circ}\text{C}$

UL Recognition: See chart above for rating. UL file number is 35289.

Materials and Finishes

Mounting Nut: Brass, tin zinc

Mounting Bushing and Cover: Zinc, zinc trivalent chromate-plated

Button and Base: Thermoset plastic

Shorting Bar: Brass, silver-plated

Spring: Tinned music wire

Contact Terminals: Beryllium copper, silver-plated $.0003''$ to $.0005''$

STANDARD OPTIONS

Epoxy sealed terminals are not available through distributors.

For terminals bent at 90° , contact Grayhill.

ORDERING INFORMATION

Description & Button Color	Part No.
SPST, N.O., Red	4001
SPST, N.O., Black	10-09
SPST, N.O., UL, Red	4001UL
SPST, N.O., UL, Black	10-09 UL
SPST, N.O., Positive Feel, Red	10-100
SPST, N.C., Positive Feel, Black	10-101
SPST, N.C., Red	10-10
SPST, N.C., Black	4002
SPST, N.C., UL, Red	10-10 UL
SPST, N.C., UL, Black	4002 UL
Accessory Nut	07C1040-1
Accessory Button Guard	10C1015-1



Pushbutton Engineering Information

Pushbutton switches are selected not only by their ratings, but also by their contact type. While nearly all rotary switches and DIP switches have wiping contacts, pushbutton switches may have either wiping or butt contacts (see internal views below).

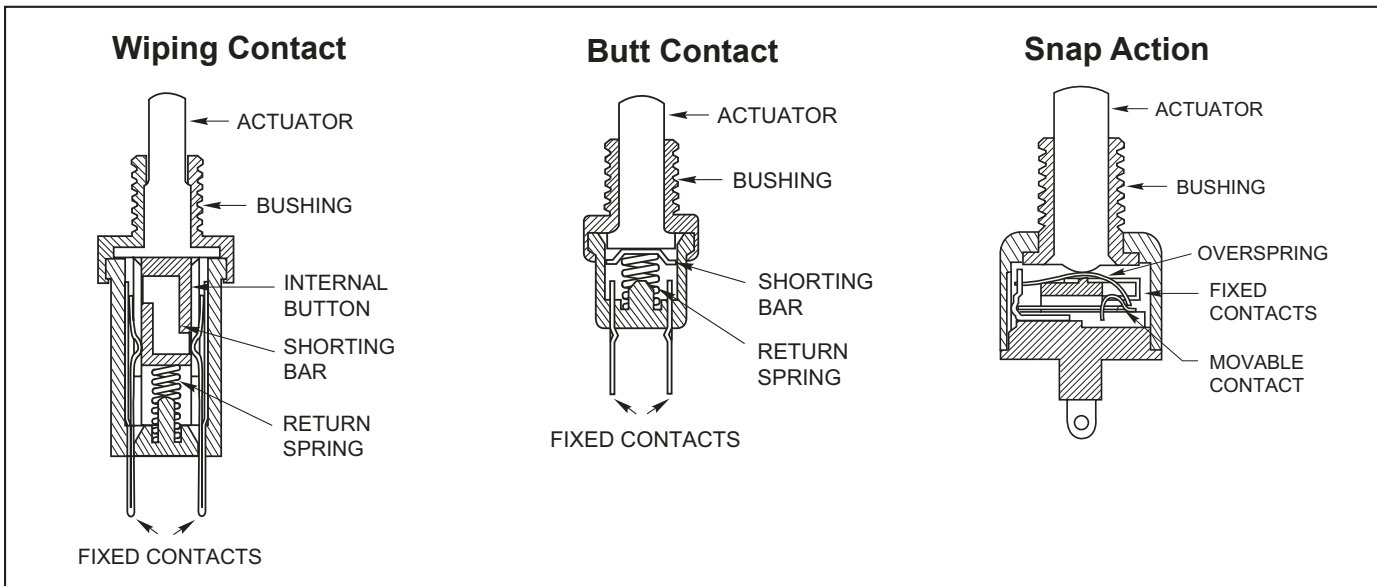
Wiping Contacts are self-cleaning and usually provide a low resistance in circuits where contact resistance is critical. However, the wiping action creates mechanical wear and conductive wear products.

Butt Contacts have less wear than wiping contacts and therefore, have a longer life. They are also smaller. Butt contacts are not self-cleaning, so their contact resistance can vary from operation to operation.

Snap Action switches are basically butt contact switches with a spring mechanism which provides the make and break. The mechanism controls both the operating point and the rate of operation, but adds to the wear of

the switch. The rapid rate of make and break means that these switches are appropriate for high current loads. They usually have a slight wiping action and contact surfaces made of precious metals to minimize their disadvantages.

Internal Views of Pushbutton Switches



Switch Terminology

Actuator: The part of the switch to which an external force is applied to operate the switch.

Alternate Action (Push-Push) Switch: A switch in which the operable position is maintained after the first actuation, and then disengaged with the second operation.

Break-Before-Make Switch (BBM): A double throw switch in which the moving contact breaks the connection with the first circuit before making contact with the second; also called non-shorting switch.

Double Throw Switch: A switch which has a normally open as well as a normally closed circuit per pole.

Joystick Action Switch: (From Joystick, the control for an airplane). A lever switch which operates with momentary action in 4 directions, and is disengaged in the upright position.

Make-Before-Break Switch (MBB): A double throw switch in which the contacts makes connection with the second circuit before breaking contact with the first; also called shorting switch.

Maintained Contact Switch: A switch in which the actuator remains in a position until it is actuated to another position where it also remains until actuated. Example: Push-Pull Switch.

Momentary Contact Switch: A switch in which the shorting bar returns from its operated position to its normal or free position when the actuating force is removed.

Operating Position or Point: The position of the actuator when the desired electrical action (make or break of contact) occurs.

N.C., Normally Closed: Switch in which the circuit is closed without actuation (with actuator in the "normal" position).

N.O., Normally Open: Switch in which the circuit is open without actuation (with actuator in the "normal" position).

Overtravel: The distance or angle between the operating position and the extreme position to which the actuator may be moved.

Pole: An electrically isolated circuit within a switch; a common terminal and all the selected terminals to which it connects.

Pretravel: The distance or angle through which the actuator moves from its free position to its electrical operating position.

Single Throw Switch: A switch which has only one normally open or one normally closed circuit per pole.

Throw: See Single Throw and Double Throw.



Circuitry*	Rating (Amps at 115 Vac Res.)	Operations At Rating	Maximum Width*** inch (mm)	Features	Series
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Butt Contact

SPST	N.O. or N.C.	5	6,000	3/8 (9,53)	UL Listed	30	
	N.O. or N.C.	1	1,000,000	3/8 (9,53)	Momentary, Terminal Seal, (Wire Leads Optnl.)	30	
	N.O.	1	500,000	3/8 (9,53)	Overtravel, Terminal Seal, (Wire Leads Optnl.)	30	
	N.O.	1	200,000	11/16 (17,46)	Positive Feel, Overtravel, Terminal Seal, (Wire Leads Optional)	30	
	On or Off	1	100,000	11/16 (17,46)	Push/Pull Action (Maintained)	30	
	N.O. or N.C.	1	250,000	1/2 (12,7)	Watertight, Terminal Seal, (Wire Leads Optnl.)	30	
	N.O.	1	1,000,000	11/16 (17,46)	Square & Round Bezels	30	
	N.O. or N.C.	1	1,000,000	1+ (25,4)	Square Bezel Panel Mount	30	
	N.O.	1	200,000	11/16 (17,46)	Pos. Feel, Overtravel, Square & Round Bezels	30	
	N.O.	1	200,000	11/16 (17,46)	Pos. Feel, Overtravel, Sq. Bezel Panel Mount	30	
	N.O.	.020**	80,000	5/16+ (8,13)	Miniature, Surface Mount	38	
	N.O.	.020**	80,000	5/16+ (8,13)	Miniature, Horizontal PC Mount	38	
	N.O.	.020**	80,000	5/16+ (8,13)	Miniature, Vertical to PC Mount	38	
	N.O. or N.C.	.250	100,000	1/4 (6,35)	Sealed Plunger, Stackable with LEDs	32	
	N.O.	.500	1,000,000	1/4 (6,35)	Miniature	39	
	N.O.	.500	500,000	1/2 (12,7)	Overtravel, Miniature Limit Switch, (Wire Leads Optional)	39	
	N.O.	.500	100,000	1/2 (12,7)	Overtravel, Miniature, (Wire Leads Optional)	39	
	N.O.	.500	250,000	5/16 (7,94)	Watertight Seal, Miniature, (Wire Leads Optional)	39	
	N.C.	.250	250,000	1/4 (6,35)	Miniature (Wire Leads Optional)	39	
	N.C.	.250	100,000	5/16 (7,94)	Watertight Seal, Miniature, (Wire Leads Optnl.)	39	
	N.C.	.250	100,000	1/2 (12,7)	Actuator Seal, Miniature Limit Switch (Wire Leads Optional)	39	
	N.O.	.150**	1,000,000	1/4 (6,35)	PC Mount, Miniature, Sealed	39	
	N.O.	.150**	1,000,000	1/4 (6,35)	PC Mount, Miniature, Right Angle, Cap Seal	39	
	N.O.	.150**	100,000	1/4 (6,35)	PC Mount, Miniature, Overtravel	39	
	N.O.	.020, .150**	1,000,000	3/8 (9,53)	Economical Contact Plating	30	
	N.O.	.020, .150**	1,000,000	3/8 (9,53)	Econ. Plating, Square Bezel Panel Mount	30	
	N.O.	.020, .150**	1,000,000	1/4 (6,35)	Economical Contact Plating	39	
	N.O.	.020, .150**	100,000	1/2 (12,7)	Actuator Seal, Overtravel, Miniature Limit Switch, (Wire Leads Optional)	39	
	SPDT	BBM	.250	100,000	1/4 (6,35)	SPST AND SPDT, Stackable w/LEDs	32
		BBM	.250	500,000	1/2 (12,7)	PC Mount, 2 Circuits, Right Angle, Total Seal	39
BBM		.020**	80,000	5/16 (8,13)	Miniature, Surface Mount	38	

Wiping Contact

SPST	N.O. or N.C.	3	6,000	13/16 (20,6)	Decorator Line	4000/10
	N.O. or N.C.	1	100,000	13/16 (20,6)	Momentary Action & Positive Feel Types	4000/10
	N.O.	.250	100,000	1/2 (12,7)	Momentary Action & Terminal Seal Types	23
	N.O.	.4VA	40,000	.177 (4,5)	Process Sealed, Subminiature	49
SPDT	BBM or MBB	.250	250,000	7/16 (11,11)	Momentary Action	46
	BBM or MBB	.250	250,000	1+ (25,4+)	Square Bezel Panel Mount	46
	BBM or MBB	.250	100,000	1/2 (12,7)	Watertight Seal	46
	BBM	.250	250,000	11/16 (17,46)	Square & Round Bezels	46
	BBM	.250	250,000	11/16 (17,46)	Alternate Action, Square & Round Bezels	46
	BBM	.250	250,000	1+ (25,4+)	Alternate Action, Square Bezel Panel Mount	46
DPDT	N.O.	.4VA	40,000	.177 (4,5)	Process Sealed, Subminiature	49
	BBM or MBB	.250	100,000	5/8 (15,88)	Momentary Action	46
	BBM	.250	250,000	13/16 (20,6)	Environmental Seal/Wire Leads	46
	BBM or MBB	.250	100,000	11/16 (17,46)	Watertight Seal	46
	BBM	.250	250,000	11/16 (17,46)	Square & Round Bezel & Positive Feel Types	46
	BBM	.250	250,000	11/16 (17,46)	Alternate Action, Square & Round Bezels	46
BBM or MBB	.250	250,000	1+ (25,4+)	Alternate Action, Square Bezel Panel Mount	46	

Snap Action Contact

SPST	N.O. or N.C.	1, 3	25,000	7/8 (22,23)	SPST, 1 and 3 Amp	4000/10
SPDT	BBM	5, 10	25,000	7/8 (22,23)	Audible Click	2000/7

* BBM is Break-Before-Make (Non-Shorting). MBB is Make-Before-Break (Shorting).

** Rated for 28 Vdc and/or 5 Vdc (.150 A) and 20 Vdc (.020 A).

*** Maximum width behind panel or above PC board rounded to next highest 1/16" (1,59 mm).



Pushbutton Options and Accessories

ACCESSORIES

For Pushbutton Switches



Decorative Mounting Nuts



Button Caps

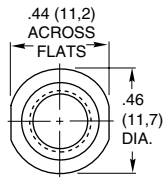
Button Guard



Pendant Housing

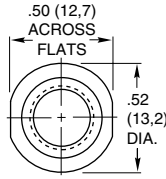
DIMENSIONS In Inches (and millimeters)

Decorative Mounting Nuts



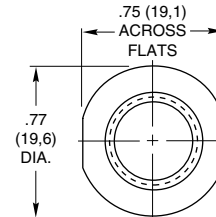
30C1023-1

Brass, nickel-plated for 1/4" (6,35) bushing.



23C1024-1

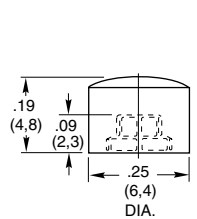
Brass, nickel-plated for 5/16" (7,93) bushing.



07C1040-1

Brass, nickel-plated for 15/32" (11,9) bushing.

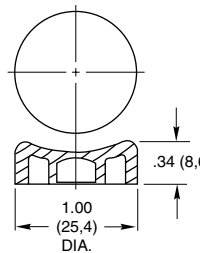
Button Caps and Guard



30B1012

Thermosetting plastic (Fasten to button with cyanoacrylate adhesive) black, red or white.

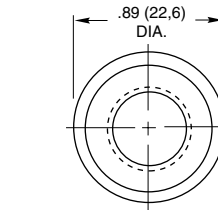
For use with all Series 30 and 39 switches except part number 39-101. See switch pages.



07Z1047

Thermoplastic, black or red color.

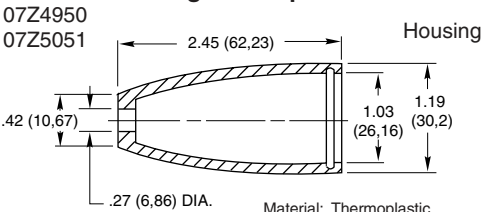
For use with Series 2000 and Series 7 switches. See switch pages.



10C1015-1

Brass, zinc trivalent chromate-plated for 15/32" (11,9) bushing.

Remote Switching Accessories Pendant Housing and Caps

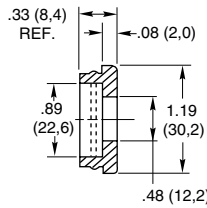


07Z4950

07Z5051

Housing

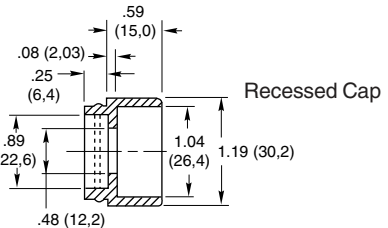
Material: Thermoplastic
Specials: other colors available on special order.



Flat Cap

Application:

All grayhill pushbutton switches with 15/32-32 bushings: catalog numbers 2201, 2202, 07-7, 07-8, 07-21, 07-22, 07-26, 4001, 4002, 10-9, 10-10, 10-100, 10-101, 30-16, 30-17 and 30-32. any other switch with 15/32-32 bushing if it fits housing.



Recessed Cap

ORDERING INFORMATION:

Mounting Nuts, Button Caps, and Guards

Part Number	Color
07C1040-1	Decorative Nut
23C1024	Decorative Nut
30C1023-1	Decorative Nut
07Z1047-1 BLK	Black Button Cap
07Z1047-2 RED	Red Button Cap
10C1015-1	Button Guard
30B1012-5	Red Cap
30B1012-8	White Cap
30B1012-9	Black Cap

Pendant Housing and Caps

Part Number	Description
07Z4950 RED	Red Flat Cap & Housing
07Z4950 BLK	Black Flat Cap & Housing
07Z5051 RED	Red Rcstd Cap & Housing
07Z5051 BLK	Black Rcstd Cap & Housing

Sold only as sets of one housing and one cap.

Available from your local Grayhill Distributor.

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