



Butt Contact Pushbutton Switches

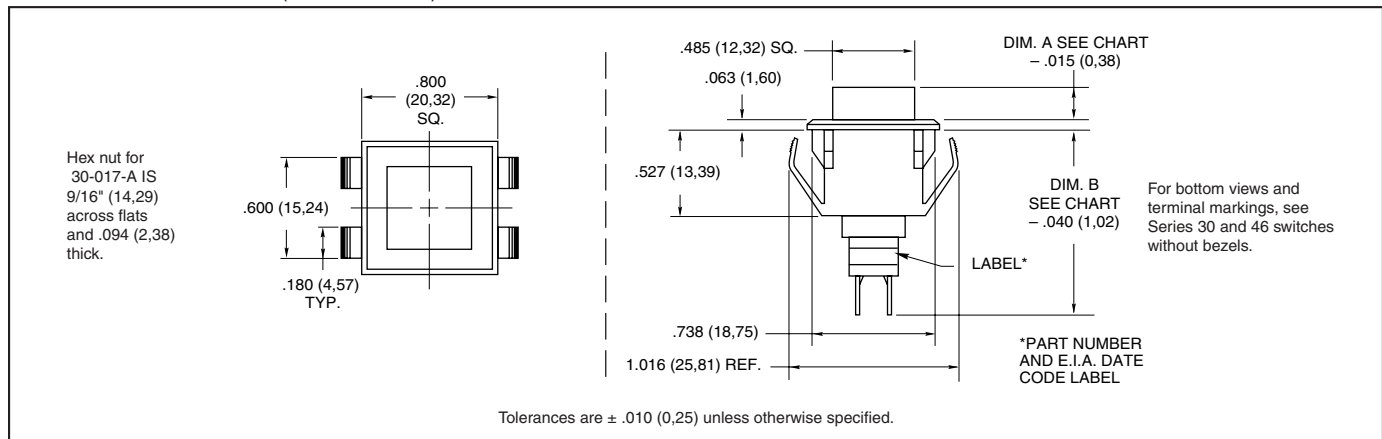
SERIES 30 and 46 Snap-in Panel Mount

FEATURES

- Sleek Black Matte Bezel
- Convenient Snap-In Front Mount
- Choice of 6 Button Colors
- SPST, SPDT or DPDT Circuitry
- Alternate Action, Positive Feel and Overtravel Versions
- Printed Button Option



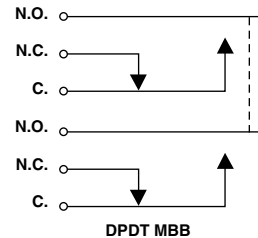
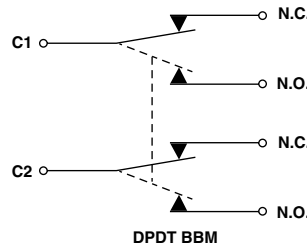
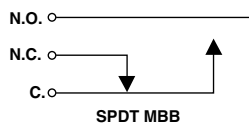
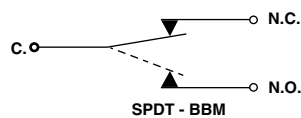
DIMENSIONS in inches (and millimeters)



Pushbutton Switches

CIRCUITRY

Switches have momentary action unless otherwise indicated in the chart below.



ADDITIONAL DIMENSIONS AND PART NUMBERS

Circuitry and Features	Dim. A: Button Height ($\pm .015$)	Dim. B: Behind Panel Length ($\pm .040$)	Total Travel	Actuating Force	Partial Part No.*
Butt Contact Switches - Series 30					
SPST-N.O.	.205 (5,21)	1.119 (28,42)	.062 \pm .010 (1,57 \pm 0,25)	10 \pm 4 oz.	30-001-A-*
SPST-N.O., Overtravel	.205 (5,21)	1.204 (30,58)	.125 \pm .020 (3,18 \pm 0,51)	8 \pm 4 oz.	30-015-A-*
SPST-N.O., Overtravel & Positive Feel	Adjustable**	Adjustable**	.156 \pm .015 (3,96 \pm 0,38)	18 \pm 4 oz.	30-017-A-*
SPST-N.O., Economical	.205 (5,21)	1.119 (28,42)	.062 \pm .010 (1,57 \pm 0,25)	10 \pm 4 oz.	30-601-A-*
SPST-N.C.	.205 (5,21)	1.132 (28,75)	.065 \pm .015 (1,65 \pm 0,38)	8 \pm 4 oz.	30-002-A-*
Wiping Contact Switches - Series 46					
SPDT, BBM	.205 (5,21)	1.417 (35,99)	.180 (4,57) min.	1.1 \pm .25 lbs.	46-102-A-*
SPDT, MBB	.205 (5,21)	1.417 (35,99)	.180 (4,57) min.	1.1 \pm .25 lbs.	46-111-A-*
SPDT, BBM, Alternate Action	.293 (7,44)	1.448 (36,78)	.180 (4,57) min.	1.5 \pm .25 lbs.	46-502-A-*
DPDT, BBM	.205 (5,21)	1.448 (36,78)	.180 (4,57) min.	2.2 \pm .5 lbs.	46-200-A-*
DPDT, MBB	.205 (5,21)	1.448 (36,78)	.180 (4,57) min.	2.2 \pm .5 lbs.	46-201-A-*
DPDT, BBM, Alternate Action	.293 (7,44)	1.448 (36,78)	.180 (4,57) min.	1.8 \pm .5 lbs.	46-402-A-*

*Partial part number, complete part number by adding a dash for button color: white -01; red -03; green -04; blue -05; yellow -06 or black -07, see Ordering Information.

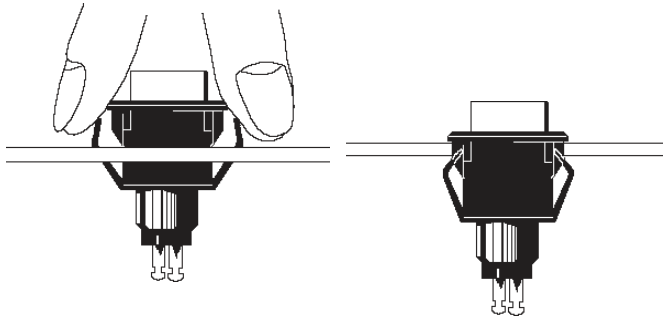
**Adjustable from Dim. A .170 (4,32) minimum, Dim. B 1.285 (32,64) maximum to Dim. A .290 (7,37) maximum, Dim. B 1.165 (29,59) minimum with hex nut below bezel.



Butt Contact Pushbutton Switches

MOUNTING

Easy Snap-In Mounting



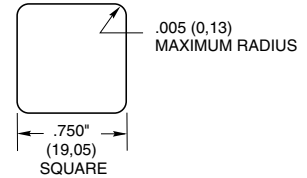
Just snap into pre-cut panel hole.

Plastic wings lock switch in place.

PANEL CUTOUT

Recommended Panel Cut

Switch will fit panels .049" (1,24) to .125" (3,18) thick. Recommended panel thickness is 18 gauge.



SPECIFICATIONS

Life Limiting Criteria—Series 30 & 46

Contact Resistance: Less than 25 milliohms on a new switch

Voltage Breakdown: 1,000 Vac between mutually insulated parts

Insulation Resistance: 1,000 megohms minimum

Ratings—Series 30

Current Rating:

30-601 150 mA, 5 Vdc resistive and 20 mA, 20 Vdc resistive

All others 1 A, 115 Vac resistive, or 0.5 A, 220 Vac resistive

Life Expectancy:

30-015 500,000 operations

30-017 200,000 operations

All others 1,000,000 operations

Ratings—Series 46

Current Rating: 250 mA, 115 Vac resistive or 125 mA, 220 Vac resistive

Life Expectancy: 250,000 operations

Materials and Finishes—Series 30

Bezel: Nylon

Button Cap: ABS plastic

Switch Bushing: Brass, tin zinc

Base: Thermoset plastic

Spring: Tinned music wire

Plunger: Polycarbonate

Shorting Bar:

30-601 Brass, gold-plated over nickel

All Others Brass with fine silver contact area

Base Contacts:

30-601 Brass, gold-plated over nickel

30-002 Brass with fine silver contact area

All Others Bronze with fine silver contact area

Terminals:

30-002 Brass, silver-plated

30-601 Bronze, gold-plated over nickel

All Others Bronze, silver-plated

Nut: Provided only on 30-017; allows button height adjustment. Brass, zinc trivalent chromate-plated.

Materials and Finishes—Series 46

Bezel: Nylon

Button Cap: ABS plastic

Switch Bushing: Brass, zinc trivalent chromate-plated.

Base: Thermoset plastic

Spring: Tinned music wire

Plunger: 46-402/502 Nickel-plated brass

All Others Polycarbonate

Shorting Bar: Phosphor bronze, silver-plated

Base Contacts: Phosphor bronze with silver contact area

Terminals: Phosphor bronze, tin/silver plating

Covers (46-200/201): Brass, zinc trivalent chromate-plated

STANDARD OPTIONS

Epoxy-sealed terminals and wire leads, see page E-35.

LEGENGING OPTION

Contact Grayhill

A button legend can be printed in epoxy ink which bonds to the surface of the button cap. Any type style or design which can be photographed can be used to produce the legend.

There is a per-button printing charge. A nominal set up charge per legend applies to orders of 1 to 99 pieces. Non-standard legends are subject to one time artwork and tooling charges. Consult Grayhill for help with actual legend.

ORDERING INFORMATION

Use the partial part number you have selected from the Dimensions and Part Number chart, and add the button color suffix. Example:

46-200-A-03 Color: 01, 03, 04, 05, 06, 07

01 = White 03 = Red 04 = Green
05 = Blue 06 = Yellow 07 = Black

SERIES 30 and 46 Decorator Line

FEATURES

- Attractive Front Panel Bezels (6 choices)
- Space-Saving: Only 5/8" Diameter (SPST & SPDT) and 3/4" Diameter (DPDT) Round Bezels
- SPST with Option of Positive Feel
- SPDT, DPDT with Momentary Contact or Alternate Action
- Sturdy Metal Sleeve or Bushing and Nut Provide Secure Mounting
- UL Recognized Version



DIMENSIONS in inches (and millimeters)

SPST—Normally Open

30-05-01-502-*
30-05-04-502-*

B = .375 ± .010 (9,53 ± 0,25) DIA.
C = .625 ± .005 (15,88 ± 0,13) DIA.
D = .255 ± .032 (6,48 ± 0,81)
E = .093 ± .010 (2,36 ± 0,25)
F = .355 ± .015 (9,02 ± 0,38)
G = .220 ± .025 (5,59 ± 0,64)

DIM A ± .020 (0,51) (SEE CHART)

1/2-32 UN-2A THREAD
INSULATING BARRIER

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

Feature	Partial Part No.	Dim. A
Momentary	30-05-01-502-*	.710 (18,03)
Pos. Feel	30-05-04-502-*	.910 (23,11)

SPDT—Break Before Make

46-05-05-502-*
46-05-07-502-*

B = .375 ± .010 (9,53 ± 0,25) DIA.
C = .625 ± .005 (15,88 ± 0,13) DIA.
D = .255 ± .032 (6,48 ± 0,81)
E = .093 ± .010 (2,36 ± 0,25)
F = .355 ± .015 (9,02 ± 0,38)
G = .150 ± .010 (3,81 ± 0,25)

DIM A - .015 (0,38) (SEE CHART)

1/2-32 UN-2A THREAD
INSULATING BARRIER

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

Terminals are marked on switch.

Feature	Partial Part No.	Dim. A
Momentary	46-05-05-502-*	.992 (25,20)
Alt. Action	46-05-07-502-*	1.278 (32,46)

DPDT—Break Before Make

46-05-08-502-* (UL)**
46-05-09-502-*

B = .375 ± .010 (9,35 ± 0,25) DIA.
C = .750 ± .005 (19,05 ± 0,13) DIA.
D = .255 ± .032 (6,48 ± 0,81)
F = SEE CHART - .015 (0,38)
E = .093 ± .010 (2,36 ± 0,25)
G = .150 ± .010 (3,81 ± 0,25)

DIM A - .015 (0,38) (SEE CHART)

5/8-32 UN-2A THREAD
INSULATING BARRIER

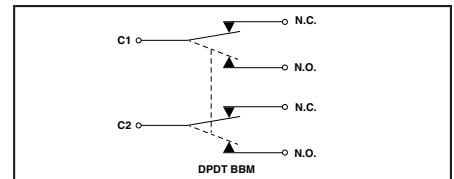
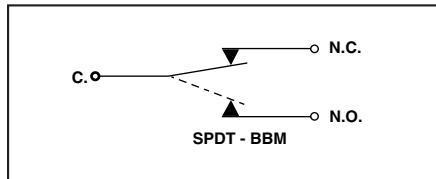
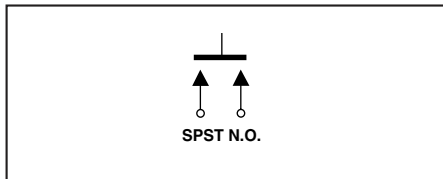
*PART NUMBER AND E.I.A. DATE CODE LABEL

Terminals are marked on switch.

Feature	Partial Part No.	Dim. A	Dim. F
Momentary	46-05-08-502-*	1.001 (25,43)	.314 (7,98)
Alt. Action	46-05-09-502-*	1.130 (28,70)	.355 (9,02)

Pushbutton Switches

CIRCUITRY



RECOMMENDED PANEL CUTOUT AND MOUNTING HARDWARE

SPST AND SPDT VERSION

.440 (11,17) MIN. ACROSS FLATS

.516 (13,10) MIN. DIA.

DPDT VERSION

.565 (14,35) MIN. ACROSS FLATS

.641 (16,28) MIN. DIA.

Note: All switches fit panels up to .250 (6,35) thick, except 46-05-08-502 which fits panels up to .187 (4,75) thick. Front and back panel access required for installation.

Mounting Hardware

For 46-05-08-502 & 46-05-09-502:
 One internal tooth lockwasher
 One knurled ring nut .765 ± .010 (19,43 ± 0,25) Dia.
 .094 ± .010 (2,39 ± 0,25) Thk.

For SPST & SPDT switches
 One internal tooth lockwasher
 One knurled ring nut .640 ± .010 (16,26 ± 0,25) Dia.
 .094 ± .010 (2,39 ± 0,25) Thk.

*Partial part number; complete part number by adding a dash for button color: white -01; red -03; green -04; blue -05; yellow -06 or black -07, see Ordering Information.
 ** Contact Grayhill for part number.



Butt Contact Pushbutton Switches

SERIES 30 and 46 Decorator Line

FEATURES

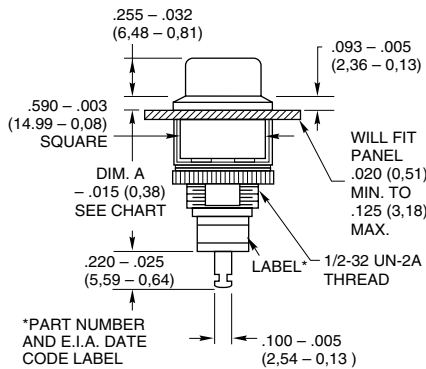
- Attractive Front Panel Bezels (6 choices)
- Space-Saving: Only 11/16" Square
- SPST with Option of Positive Feel
- SPDT, DPDT with Momentary Contact or Alternate Action
- Sturdy Metal Sleeve or Bushing and Nut Provide Secure Mounting



DIMENSIONS in inches (and millimeters)

SPST—Normally Open

30-01-01-500-*
30-01-04-500-*

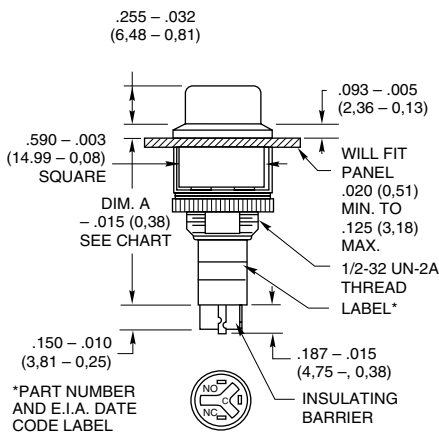


*PART NUMBER AND E.I.A. DATE CODE LABEL

Feature	Partial Part No.	Dim. A
Momentary	30-01-01-500-*	.880 (22,35)
Pos. Feel	30-01-04-500-*	1.037 (26,34)

SPDT—Break Before Make

46-01-07-500-*



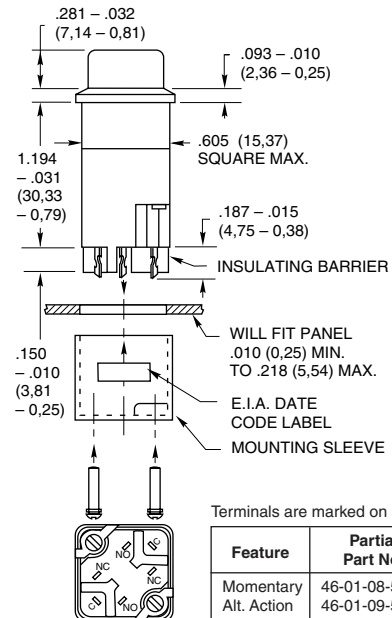
*PART NUMBER AND E.I.A. DATE CODE LABEL

Terminals are marked on switch.

Feature	Partial Part No.	Dim. A
AltAction	46-01-07-500-*	1.264 (32,11)

DPDT—Break Before Make

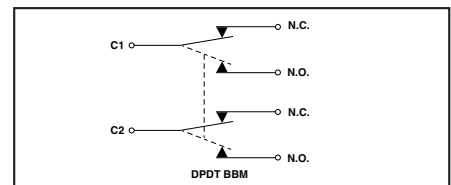
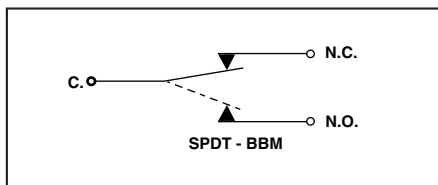
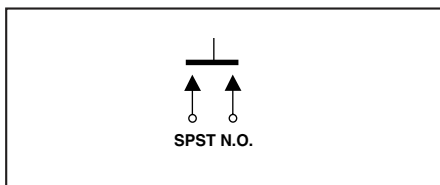
46-01-08-500-*
46-01-09-500-*



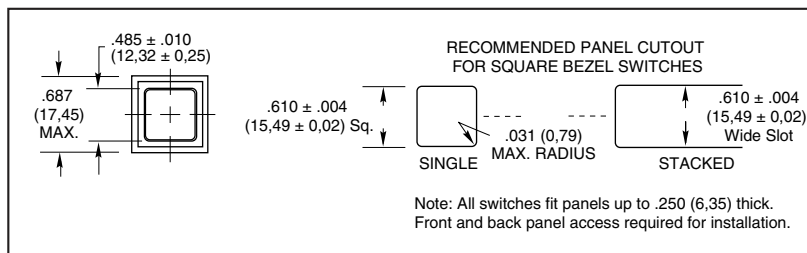
Terminals are marked on switch.

Feature	Partial Part No.
Momentary	46-01-08-500-*
Alt. Action	46-01-09-500-*

CIRCUITRY



FRONT VIEWS AND MOUNTING



Mounting Hardware

For 46-01-08-500 & 46-01-09-500

(See drawing above—mounting hardware shipped loose.)

For SPST & SPDT switches

One internal tooth lockwasher
One knurled ring nut .640 ± .010 (16,26 ± 0,25) DIA.
.094 ± .010 (2,39 ± 0,25) Thk.

*Partial part number; complete part number by adding a dash for button color: white -01; red -03; green -04; blue -05; yellow -06 or black -07, see Ordering Information.

SPECIFICATIONS

Material and Finishes

Lockwasher (Round Bezel): Steel, zinc trivalent chromate-plated

Behind Panel Plate (Square Bezel): Steel, zinc trivalent chromate-plated

Mounting Sleeve and Screws

(46-01-08-500, 46-01-09-500 only): Steel, zinc trivalent chromate-plated. **Base:** Phenolic per MIL-M-14, Type CFG

Square Bezel: ABS (SPST, SPDT), thermoset plastic (DPDT)

Mounting Nut, Bushing, and Round Bezel: Brass, tin zinc

Button Cap: ABS (UL version is PPS)

Shorting Bar: Series 30—Fine silver contact area

Series 46—Phosphor bronze, silver-plated

Terminals: Series 30—Fine silver contact area with silver-plated terminal ends

Series 46—Silver contact surface with tin/silver clad terminal ends

Spring: Tinned music wire

Plunger: Polyphenylene sulfide (PPS) for

30-01-01-500-X. Nickel-plated brass for

46-01-07-500-X, 46-05-07-502-X,

46-01-09-500-X and 46-05-09-502-X. Zinc

trivalent chromate-plated brass for

46-01-08-500-X. Polycarbonate for all others.

Operating Temperature: -40°C to +85°C

RATINGS

Electrical Ratings	Series 30	Series 46
Contacts	Butt type	Wiping type
Rating at 115 Vac Res.	1 Amp	0.25 Amp
Rating at 220 Vac Res.	0.5 Amp	0.125 Amp
Circuitry	SPST–N.O. (Standard); SPST–N.O. (w/Overtravel), SPST–N.O. (w/Positive Feel)	SPDT, DPDT Break Before Make
Life Expectancy	SPST–N.O. (Standard): 1,000,000 operations SPST–N.O. (w/Positive Feel): 200,000 operations; SPST–N.O. (w/Overtravel): 500,000 operations	250,000 operations
Contact Resistance	25 milliohms or less on a new switch	
Voltage Breakdown	1000 Vac between mutually insulated parts	
Insulation Resistance	1000 megohms minimum	
Operating Temperature	-40°C to +85°C	

LEGENDS

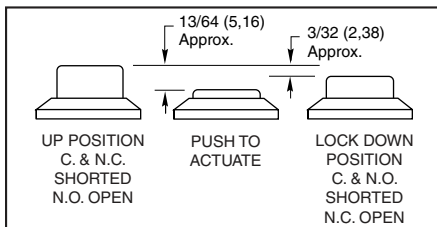
All button caps can be printed in epoxy ink. Any type style or design can be used to produce the legend. If News Gothic Condensed style is used, limits can be approximated from the chart below; actual limits depend on specific legend.

There is a per-button impression charge. A nominal set up charge per legend applies to orders of 1 to 99 pieces. (Non-standard legends are subject to a one time tooling charge. Contact Grayhill for more specifics.)

ALTERNATE ACTION (PUSH-PUSH) OPERATING SEQUENCE

Part Number* 46-05-07-502, 46-05-09-502,
46-01-07-500, 46-01-09-500

Alternate action (Push-Push) switches provide a maintained actuated position until the button is pushed again to release.



STANDARD OPTIONS

Epoxy-sealed terminals and wire leads

Grayhill Type Identification No.	Character Height (Typ.)	Sample Style and Sizes	Square Button Character and Line Limitation		Round Button Character and Line Limitation	
			Character	Line	Character	Line
4GH088	.083 (2,1)	ABCDEFGHIJ	6 Char. 2 Lines	TAB LOCATE	3 Char. 1 Line	OFF
1GH125	.138 (3,5)	ABCDEFGHIJ	5 Char. 1 Lines	INDEX	3 Char. 1 Line	TAB
3GH187	.207 (5,3)	ABCDEF	3 Char. 1 Line	OFF	2 Char. 1 Line	15
2GH250	.276 (7,0)	ABCD	2 Char. 1 Line	15	N/A	N/A

ORDERING INFORMATION & OPERATING FEATURES

Butt Contact	Square Bezel	Round Bezel	Circuitry	Feature	Total Travel	Bottoming Force	Actuating Force	Overtravel
Butt Contact	30-01-01-500-*	30-05-01-502-*	SPST–N.O.	Momentary	.080 ± .015 (2,03 ± 0,38)	—	10 ± 4 oz.	—
	30-01-04-500-*	30-05-04-502-*	SPST–N.O.	Positive Feel & Overtravel	.156 ± .015 (3,96 ± 0,38)	—	18 ± 4 oz.	.046 Min.
Wiping Contact	-	46-05-05-502-*	SPDT	Momentary	.180 min. (4,57)	1.1 ± .25 Lbs.	—	—
	46-01-07-500-*	46-05-07-502-*	SPDT	Alternate Action	.210 ± .015 (5,33 ± 0,38)	1.5 ± .25 Lbs.	—	—
	46-01-08-500-*	46-05-08-502-*	DPDT	Momentary	.180 min. (4,57)	1.6 ± .5 Lbs.	—	—
	46-01-09-500-*	46-05-09-502-*	DPDT	Alternate Action	.210 ± .015 (5,33 ± 0,38)	1.8 ± .5 Lbs.	—	—

*Partial part number; complete the part number by adding a dash for button color: white –01; red –03; green –04; blue –05; yellow –06 or black –07.



SEALED TERMINAL AND WIRE LEAD OPTIONS OPTION -E AND -EW

FEATURES

- 1/4, 1/2, and 1 Amp
- Limit, Overtravel, or Panel Seal
- Butt or Wiping Contact
- Normally Open or Normally Closed
- Momentary or Push/Pull
- Series 23, 30, 39 and 46



Option -E
Epoxy-Sealed
Terminals

Option -EW,
Potted Base & 6"
Wire Leads



SPECIFICATIONS

Rating Criteria

Make and Break Current Rating: See page for standard part number

Contact Resistance: 25 milliohms maximum on a new switch. Less than 4 milliohms per inch of wire for wire lead option styles.

Insulation Resistance: 1,000 megohms minimum between mutually insulated parts

Voltage Breakdown: 1,000 Vac minimum between mutually insulated parts

Materials and Finishes

Potting Sleeve (Series 39): Thermoset Plastic

Wire Leads: #26AWG, (.99mm diameter) insulated Teflon, Copper stranded wire, per MIL-W-16878, Type E. Ends are stripped 0.250" (6.35) and solder dipped. For other specifications, see Page References.

Standard Part Number Red Button	Standard Part Number Black Button	Choices of Suffix	Length Behind Panel In inches (and millimeters)	
			Standard Switch & Terminals	-EW Style Body
23-1	23-4	-E	0.665 (16,89)	—
30-1	30-3	-E, -EW	0.592 (15,04)	0.645 (16,38)
30-15	30-37	-E, -EW	0.679 (17,25)	0.728 (18,49)
30-17 RED	30-17 BLK	-E, -EW	0.958 (24,33)	1.007 (25,58)
30-16 RED	30-16 BLK	-E, -EW	0.958 (24,33)	1.007 (25,58)
30-251 RED	30-251 BLK	-E, -EW	0.632 (16,05)	0.685 (17,40)
30-252 RED	30-252 BLK	-E, -EW	0.645 (16,38)	0.700 (17,78)
30-32 RED	30-32 BLK	-E, -EW	0.867 (22,02)	0.896 (22,76)
30-6	30-2	-E, -EW	0.605 (15,37)	0.640 (16,26)
30-601 RED	30-601 BLK	-E, -EW	0.592 (15,04)	0.645 (16,38)
39-1*	39-3*	-EW**	0.315 (8,00)	0.440 (11,18)
39-12*	39-2	-E, -EW	0.490 (12,45)	0.575 (14,61)
39-101	39-24*	-EW**	0.455 (11,56)	0.575 (14,61)
39-351 RED	39-351 BLK	-EW**	0.650 (16,51)	0.775 (19,69)
39-352 RED*	39-352 BLK*	-E, -EW	0.350 (8,89)	0.450 (11,43)
39-601 RED	39-601 BLK	-E, -EW	0.529 (13,44)	0.630 (16,00)
39-701***	—	-EW*	0.315 (8,00)	0.440 (11,18)
39-702***	—	-EW**	0.800 (20,32)	0.925 (23,50)
46-101 RED	46-101 BLK	-E, -EW	0.510 (12,95)	0.750 (19,05)
46-102 RED	46-102 BLK	-E, -EW	0.890 (22,61)	0.957 (24,31)
46-110 RED	46-110 BLK	-E, -EW	0.890 (22,61)	0.957 (24,31)
46-111 RED	46-111 BLK	-E, -EW	0.890 (22,61)	0.957 (24,31)
46-150 RED	46-150 BLK	-E, -EW	0.890 (22,61)	0.957 (24,31)
46-151 RED	46-151 BLK	-E, -EW	0.957 (24,31)	1.024 (26,01)
46-200 RED	46-200 BLK	-E	0.957 (24,31)	1.024 (26,01)
46-201 RED	46-201 BLK	-E	0.921 (23,39)	—
46-270 RED	46-270 BLK	-E	0.921 (23,39)	—
46-271 RED	46-271 BLK	-E	0.957 (24,31)	—

*Epoxy potting sleeve enlarges the diameter of the -EW style to 0.300 (7,62).

**Sealed terminal (-E) option is not necessary; terminals have sealed construction.

***Natural Color Button

†Adjustable from 1.214 (30,84) to 1.334 (33,88) dependent on button height, see switch pages.

ORDERING INFORMATION

Use the Selector Charts at the beginning of the section to select a series. Use the pages listed there or referenced here to select a switch.

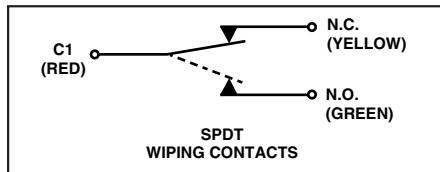
To order epoxy sealed terminals, add the suffix -E to the selected part number as allowed in the chart. **Example:** 30-1-E.

To order the epoxy-potted version with 6-inch wire leads, use the suffix -EW as allowed in the chart. **Example:** 39-1-EW

Available From Your Local Grayhill Distributors. For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

Standard Part Number Without Options Choice of Button Color (see switch pages)	Standard Part Number Choice of Button Color (see switch pages)	Choices of Options	Length Behind Panel In inches (and millimeters)	
			Standard Switch & Terminals	-EW Style Body
—	30-001-A-XX	-E, -EW	1.119 (28,42)	1.172 (29,77)
—	30-002-A-XX	-E, -EW	1.132 (28,75)	1.167 (29,64)
—	30-015-A-XX	-E, -EW	1.204 (30,58)	1.253 (31,83)
—	30-017-A-XX	-E, -EW	Adjustable†	Adjustable†
30-01-01-500-XX	30-1-1-50-XX	-E, -EW	1.100 (27,94)	1.153 (29,29)
30-01-04-500-XX	30-1-4-50-XX	-E, -EW	1.257 (31,93)	1.310 (33,27)
30-05-01-502-XX	30-5-1-52-XX	-E, -EW	0.930 (23,62)	0.983 (24,97)
30-05-04-502-XX	30-5-4-52-XX	-E, -EW	1.130 (28,70)	1.183 (30,05)
—	30-601-A-XX	-E, -EW	1.119 (28,42)	1.172 (29,77)
46-01-07-500-XX	46-1-7-50-XX	-E, -EW	1.451 (36,86)	1.518 (38,56)
46-01-08-500-XX	46-1-8-50-XX	-E	1.381 (35,08)	—
46-01-09-500-XX	46-1-9-50-XX	-E	1.381 (35,08)	—
46-05-05-502-XX	46-5-5-52-XX	-E, -EW	1.179 (29,95)	1.246 (31,65)
46-05-07-502-XX	46-5-7-52-XX	-E, -EW	1.465 (37,21)	1.532 (38,91)
46-05-08-502-XX	46-5-8-52-XX	-E	1.188 (30,18)	—
46-05-09-502-XX	46-5-9-52-XX	-E	1.317 (33,45)	—
—	46-102-A-XX	-E, -EW	1.417 (35,99)	1.484 (37,69)
—	46-111-A-XX	-E, -EW	1.417 (35,99)	1.484 (37,69)
—	46-200-A-XX	-E	1.448 (36,78)	—
—	46-201-A-XX	-E	1.448 (36,78)	—

CIRCUITRY: Series 46



*Epoxy potting sleeve enlarges the diameter of the -EW style to 0.300 (7,62).
 **Sealed terminal (-E) option is not necessary; terminals have sealed construction.
 ***Natural Color Button
 †Adjustable from 1.214 (30,84) to 1.334 (33,88) dependent on button height, see switch pages.

Pushbutton Switches