

SERIES 200 SWITCH – APPLICATIONS & PRODUCT DATA SHEET

The Series 200 ultra-compact line of switches represents an integration of 4-pole switching capabilities, high LED lighting performance, and Military grade reliability in a subcompact package. With an overall length of less than 1 inch. This switch has the ability to fit where most switches cannot.

Features:

- Shortest switch on the market.
- Lowest operating temperature.
- Lightest weight: 11 grams.
- Lowest power consumption.
- Non-reflective surface.
- Uniform LED illumination.
- Clarity of legends.
- LED polarity insensitive.

- One, Two and Four-Pole snap action.
- Crimp pin, Solder, or PC termination.
- Alternate, Momentary, or Indicator.
- NVIS compatible.
- Sunlight readable.
- Drip proof, Splash proof, Watertight seal, and solvent resistant.
- Nonlinear dimming: 5 VDC, 28 VDC; Step dimming: 28 VDC
- Built to meet and exceed the requirements per MIL-PRF-22885 and MIL-STD-3009 display formats and for all colors.

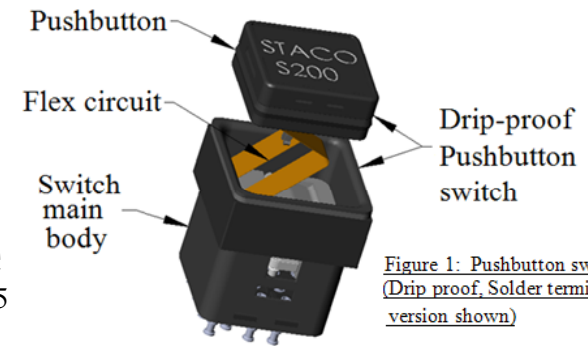


Figure 1: Pushbutton switch (Drip proof, Solder termination version shown)

Mechanical Specifications for Drip-proof Design

The Series 200 switches are unique in that the pushbutton is an attached integral part to the switch by means of flex circuit and shall not be separated from the switch's main body. Refer to figure 1. The pushbutton should only be extracted from switch's main body, when necessary, to access the mounting system.

Mechanical Characteristics

Switch Outline dimensions: See figure 2.

Actuation force: 2 to 5 lbs.

Actuation travel: 0.070" typical.

Alternate action travel (latch/hold): 0.04".

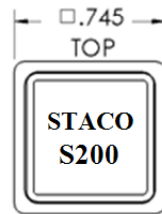


Fig. 2 - Drip-proof, top view

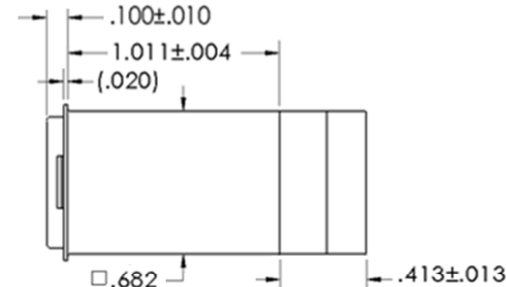


Fig. 2 - Crimp pin termination

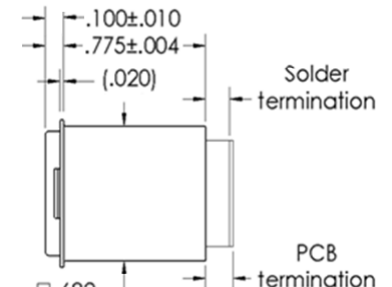


Fig. 2 - Solder / PC terminations

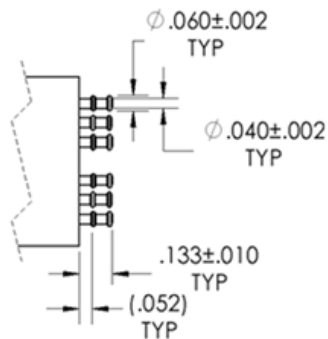


Fig. 3 - Solder termination

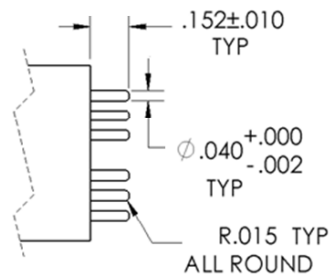


Fig. 4 - Printed circuit termination

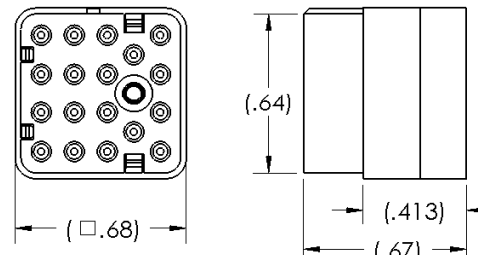


Fig. 5 - Crimp pin receptacle

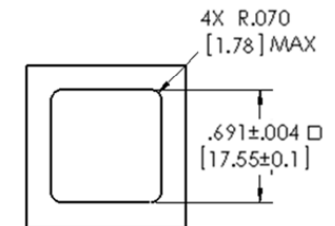


Fig. 6 - Panel cutout

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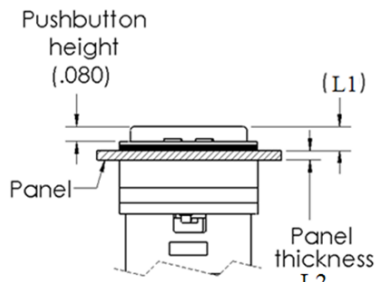


Fig. 7 - Flushed mount

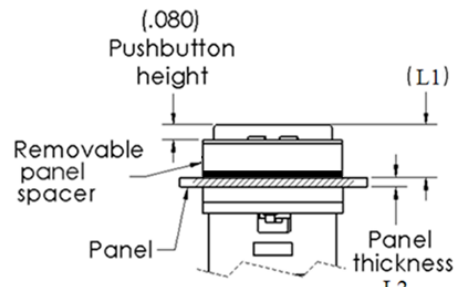


Fig. 8 - Extended mount

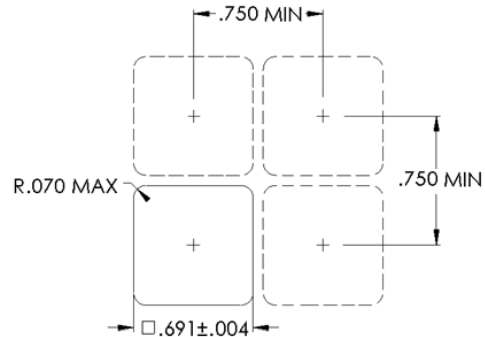


Fig. 9 - Panel cutout, center to center

Table 1: Panel thickness maximum

Description	Flushed mount	Extended mount
Cap protrusion (L1)	(0.130")	(0.280")
Panel thickness Max. L2	0.330"	0.180"

Electrical Specifications

The Series 200 pushbutton switches offer two input voltages, 5 VDC and 28 VDC. For 5 VDC applications, the LEDs are connected in parallel and use 24 mA per quadrant when illuminated. For 28 VDC applications, the LEDs are connected in series and use 12 mA per quadrant when illuminated.

Dimming the luminance to the desired level is accomplished by varying the applied voltage. The Series 200 switch has both linear and non-linear dimming circuits with built-in voltage control. 5VDC switches are available with linear dimming circuits only. 28 VDC switches are available in either linear or non-linear dimming circuits.

The Series 200 switch with HB LED's utilizes a bridge rectifier in each of its four lighting circuits to provide polarity insensitivity. This enables application in current sinking or current sourcing circuits.

The Series 200 switch contacts are designed for universal applications, 10 μA to 10A. However, contacts subjected to a high current (>100 mA) lose their low current capability (<100 mA).

Table 3: Power Consumption	VDC	Watt
	28	1.4
	5	0.5

Low Touch Temperature: +10° C above ambient.
 Electrical load range: 1 μA to 10 A
 Switch contact simultaneity: 250 μs
 Contact resistance: 0.025 Ω

Table 2: Switch Contact Rating		Sea level	50,000 ft
		(Ampere)	
28 VDC	Resistive	10.0	5
	Inductive	4.0	2.5
115 VAC, 60Hz	Resistive	7.0	---
	Inductive	7.0	---
LOW LEVEL	Resistive	10 microamperes	
	Inductive		

Switch termination and diagram

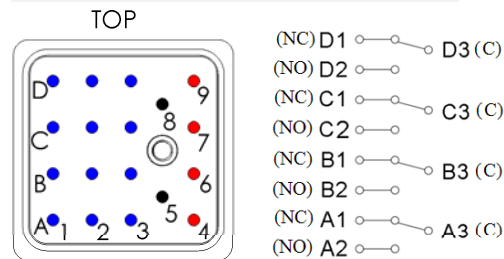


Fig. 10 - 4 Pole double throw version shown

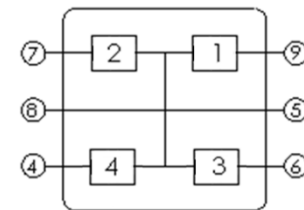


Fig. 11 - Rear view common ground, & 4 wire input, version shown

- Rows A, B, C, D and columns 1, 2, 3, identify switch contact terminations.
- Pins 4, 6, 7 and 9, identify backlight circuit terminations.
- Pins 8 and 5, identify ground terminations.

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Display and Optical Specifications

Display Style										
Full screen	2 – way		3 – way				4 – way			
1	1	2	1	2	3	1	2	3	1	2

Non-NVIS Illuminating color		NVIS Illuminating color	
MIL-PRF-22885G	Description	MIL-PRF-22885G	Description
B	Blue	---	Blue
R	Red	L	Red
G	Green	J	Green B
Y	Aviation yellow	K	Yellow B
D	Lunar white	---	White
W	White	K	Yellow A
Z	Aviation green	H	Green A

Display type												
MIL-PRF-22885G	C	B	H	N	W	S	S	Additional Display Types *				
STACO PN CODE	1	2	3	4	5	6	7	A	E	F	G	
NON-ILLUMINATED	LED				LED	LED			LED	LED		LED
ILLUMINATED	LED	LED	LED	LED	LED	LED	LED	LED	LED	LED	LED	LED

* Available as non-standard catalogue display type.

Type 1 – Translucent color background with visible opaque black legends. When illuminated, the legend remains opaque black and the background appears in color.

Type 2 – Obscure legends. When illuminated, the background appears in color with opaque black legends.

Type 3 – Obscure legends. When illuminated, the legends appear in color with opaque black background.

Type 4 – Always visible white legends on an opaque black background. When illuminated, the legends appear in color with opaque black background.

Type 5 – Trans-reflective white background with visible opaque black legends. When illuminated, the background appears in color while opaque legends remain black.

Type 6 – Obscure legends. When illuminated, the legend is sunlight readable on an opaque black background.

Type 7 – Obscure legends. When illuminated, the legend is NVIS compatible on an opaque black background

Type A - Always visible opaque white legends on an obscured colored background. When illuminated, the legends remains opaque white while the background appears in color.

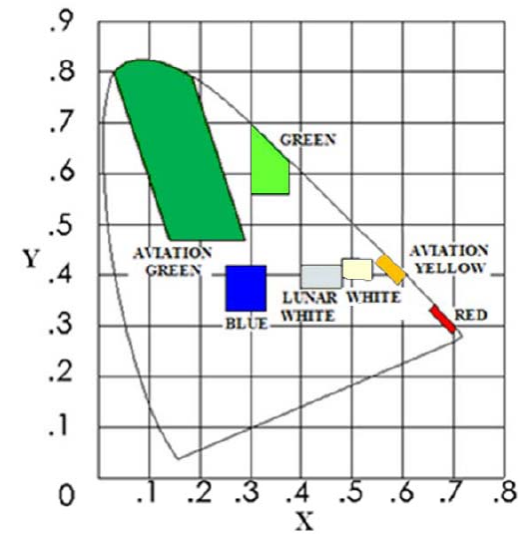
Type E - Always trans-reflective white legends on an opaque black background. When illuminated, the legends appear in color while the opaque background remains black.

Type F – White translucent background with obscured legends. When illuminated, the legends appear opaque white while background appears in color.

Type G - Translucent color background with visible opaque white legends. When illuminated, the legends remain opaque white while the background appears in color.

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22885 Symbol	Minimum Average Luminance Estimates (footlamberts)										Chromaticity CIE 1931 (Typical)		Chromaticity UCS 1976 (Typical)	
	C	B	H	N	W	S	Additional display types				CIE x	CIEy	UCS u'	UCS v'
S200 Code	1	2	3	4	5	6	A	E	F	G				
Red	100	100	150	2	125	400	100	100	125	100	0.6883	0.311	0.5141	0.5226
Green	100	100	150	2.5	100	250	100	100	100	100	0.3275	0.5869	0.1395	0.5626
Aviation Yellow	250	250	300	3	250	450	250	250	250	250	0.5960	0.4021	0.3593	0.5456
Lunar White	150	150	200	3	150	450	150	150	150	150	0.4417	0.3983	0.2562	0.5198
Blue	100	100	100	2	100	200	100	100	100	100	0.2896	0.3792	0.0686	0.5485
Aviation Green	100	100	100	2	100	250	100	100	100	100	0.1699	0.6035	0.1662	0.4896
White	150	150	175	2.5	150	450	150	150	150	150	0.5084	0.4125	0.2933	0.5355

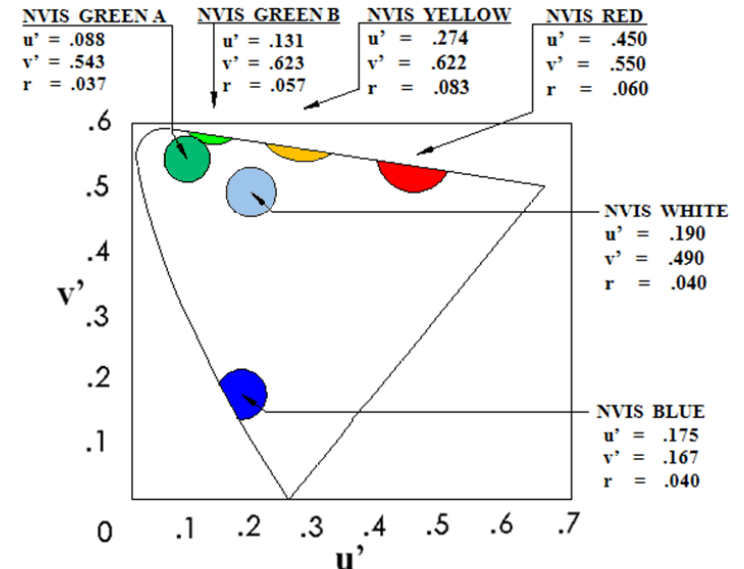


CIE 1931 chromaticity diagram

Chromaticity CIE 1931 Color Limit Chart													
Red		Green		Aviation Yellow		Lunar White		Blue		Aviation Green		White	
x	y	x	y	x	y	x	y	x	y	x	y	x	y
0.695	0.285	0.300	0.560	0.545	0.425	0.400	0.375	0.250	0.330	0.140	0.470	0.480	0.395
0.705	SL 1/	0.300	SL 1/	0.560	SL 1/	0.400	0.420	0.250	0.420	0.290	0.470	0.480	0.435
0.650	0.330	0.375	0.560	0.590	0.382	0.480	0.375	0.330	0.330	0.030	SL 1/	0.540	0.431
0.660	SL 1/	0.375	SL 1/	0.604	SL 1/	0.480	0.420	0.330	0.420	0.185	SL 1/	0.540	0.391

1/ The term "SL" indicates where the intersections occur with the spectrum locus on the CIE chromaticity diagram.

Night Vision Imaging System Compatibility								
Color	Minimum Luminance Estimates (fL)	Chromaticity 1976 UCS (Typical)		Contrast - 0°/45° Degrees @10,000 FC		Radiance		
		UCS u'	UCS v'	"ON"	"OFF"	Nra	Nrb	Scaled Luminance (fL)
Green A	300.0	0.0990	0.5463	> 1.0	< 0.1	4.2 E-12	2.6 E-13	0.1
Green B	340.0	0.1406	0.5696	> 1.0	< 0.1	1.4 E-11	3.6 E-12	0.1
Yellow A	275.0	0.2751	0.5569	> 0.9	< 0.1	4.7 E-11	1.1 E-11	0.1
Yellow B	380.0	0.2705	0.5582	> 1.0	< 0.1	2.7E-08	1.1 E-08	15
Red	275.0	0.4704	0.5293	> 0.9	< 0.1	9.1 E-08	5.1E-08	15
White	300.0	0.2074	0.4975	> 0.9	< 0.1	7.9 E-11	3.8E-11	0.1
Blue	75.0	0.1639	0.1605	> 0.2	< 0.1	2.2E-13	1.8E-12	0.1



U.C.S. 1976 chromaticity diagram