

INCH-POUND

MIL-PRF-22885/110B
w/ Amendment 1
16 December 2003
SUPERSEDING
MIL-PRF-22885/110B
1 March 2001

PERFORMANCE SPECIFICATION SHEET

SWITCH, PUSHBUTTON, ILLUMINATED,
4-LAMP, SUNLIGHT READABLE, NIGHT VISION IMAGING SYSTEM COMPATIBLE,
EMI/RFI SHIELDED, DRIPPROOF, SNAP ACTION,
4PDT, MOMENTARY, ALTERNATE

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the switches described herein shall consist of this specification and MIL-PRF-22885.

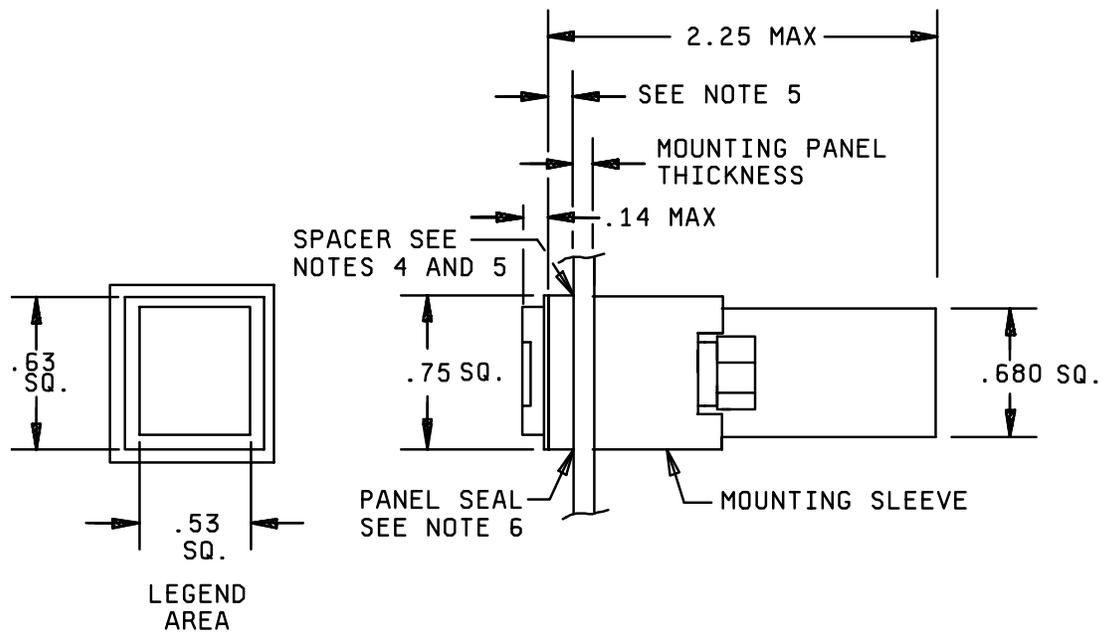
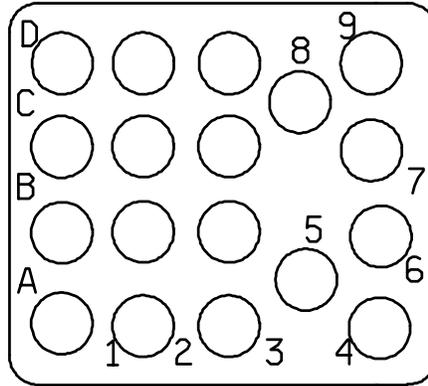


FIGURE 1. Switch dimensions and configuration.



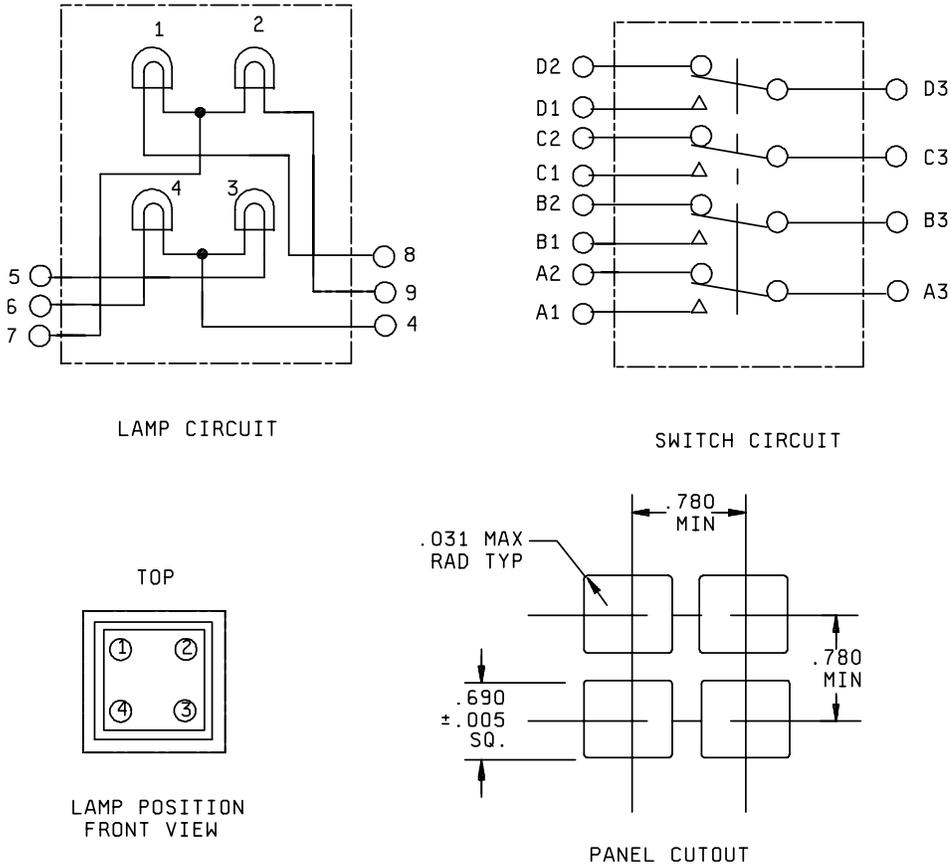
CONNECTOR BLOCK TERMINAL ARRANGEMENT
REAR VIEW

Inches	mm	Inches	mm
.10	2.5	.680	17.27
.14	3.6	.75	19.1
.53	13.5	2.25	57.2
.63	16.0		

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise specified, tolerance are ± 0.010 (± 0.25 mm) for three place decimals and ± 0.03 (± 0.8 mm) for two place decimals.
4. Spacer used in front of mounting panel provides for mounting in conjunction with standard .200/.240 (5.08/6.10 mm) thick edge lighted panel. Same spacer used in rear of mounting panel provides for mounting without edge lighted panel.
5. Spacer supplied with this assembly is .100 (2.54 mm) thick for unsealed application. Spacer supplied for sealed application is .070 (1.78 mm) thick.
6. Panel seal, supplied with switch when required, always mounts against front of mounting panel.
7. Connector block accepts wire terminal M39029/1-100, not supplied with switch.
8. Pushbutton shall be designed to prevent incorrect insertion into switch housing.
9. Pushbutton shall be held captive to switch body by retaining element to prevent accidental interchange.
10. Exact shape of switch is optional provided dimensions specified are not exceeded.

FIGURE 1. Switch dimensions and configuration - Continued.



Inches	mm	Inches	mm
.005	0.13	.690	17.53
.031	0.79	.780	19.81

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.

FIGURE 2. Lamp/switch circuits and panel cutout.

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REQUIREMENTS:

Dimensions and configurations: See figures 1 and 2.

Complete switch shall consists of:

- 1 Pushbutton: Includes front lens, color filters, lens retainer and lamp box. Integral seal and EMI/RFI shielding shall be provided when required.
- 1 Switch body: Includes 4 pole switch mechanisms, connector block, and mounting means.
- 4 Lamps: T-1 subminiature flange base, not included. Order separately or specify on contract or purchase order.

Material:

Housing, mounting sleeve and panel spacer: Aluminum alloy with black anodize or chemical film finish. Parts designed to be exposed at the front of the panel after assembly shall have a black lusterless finish.

Enclosure design: 1 (unsealed) or 2 (dripproof).

Temperature characteristic: 1 (-55°C to -85°C). During tests requiring lamps to be energized, the high temperature characteristic is 71°C +3°C, -0°C .

Vibration grade: 3 (10 - 2,000 Hz).

Shock: 75 g's, half-sine (MIL-STD-202, method 213, test condition B).

Operation: A (momentary action), E (position indicating alternate action).

Display type: Sunlight readable (S)

Weight: 1.06 ounces (30 grams) maximum.

Operating characteristics:

Actuation force: 5 pounds (22.2 N) maximum.

Total pushbutton travel: .130 to .140 inch (3.3 to 3.6 mm)

Pushbutton extraction force: 2 to 4 pounds (8.9 to 17.8 N).

Coincidence of operating and releasing points: 2 milliseconds maximum (including contact bounce).

Electrical endurance:

Resistive load - 28 V dc: 8 amperes (sea level), 4.5 amperes (50,000 ft).

Inductive load - 28 V dc: 4 amperes (sea level), 2.5 amperes (50,000 ft).

Lamp load - 28 V dc: 1 ampere (sea level and 50,000 feet)

Low level life: 100,000 cycles.

Logic level circuit: 50,000 cycles.

Dielectric withstanding voltage at reduced barometric pressure: MIL-STD-202, method 105, test condition B (50,000 feet).

Mechanical endurance: 100,000 cycles.

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EMI/RFI shielding: Applicable to EMI/RFI shielded switches.

Color and luminance: See tables I and II.

Sunlight readability: Applicable to display type S switches only.

Contrast with lamps illuminated: Measurements shall be taken with $\phi_1 = 45$ degrees and $\phi_2 = 0$ degrees only. (This procedure does not test readability under specularly reflective (glare) condition.)

Night vision imaging system (NVIS) compatibility: Applicable to display type S switches only.

TABLE I. Luminance.

Display type	Color	Color code	Foot-lamberts <u>1/</u>					
			Without EMI/RFI requirement			With EMI/RFI requirement		
Standard displays <u>2/</u>								
Sunlight readable: Legend is not legible until illuminated. When illuminated, legend appears in color; background remains black.								
S	Yellow	Y	350			300		
S	Red	R	200			175		
S	Green	Z	250			200		
S	White	D	250			200		
S	Blue	B	200			175		
NVIS compatible displays <u>3/</u>								
Sunlight readable: Legend is not legible until illuminated. When illuminated, legend appears in color; background remains black.			Full display <u>4/</u>	Half display <u>4/</u>	Quarter display <u>4/</u>	Full display <u>4/</u>	Half display <u>4/</u>	Quarter display <u>4/</u>
S	Green A	H	250	200	150	200	150	130
S	Green B	J	250	200	150	200	150	130
S	Yellow	K	250	200	150	200	150	130
S	Red	L	180	150	150	160	150	130

1/ Minimum average.

2/ Standard displays shall be illuminated by four T-1 subminiature flange base lamps of 0.15 ± 0.01 mean spherical candlepower (mscp).

3/ NVIS compatible displays shall be illuminated by four T-1 subminiature flange base lamps of 0.22 ± 0.01 mean spherical candlepower (mscp).

4/ Display segments are as defined in table V.

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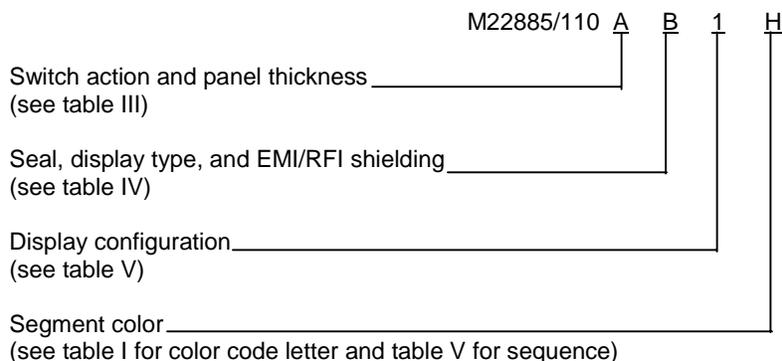
TABLE II. Illuminated colors - standard displays. ^{1/}

Color	x ^{2/}	y ^{2/}
Red ^{3/} (R)	.665 .663 .711 .713	SL ^{4/} .335 .287 SL ^{4/}
Aviation green ^{3/} (Z)	.096 .140 .290 .246	.600 .470 .470 .600
Aviation yellow ^{3/} (Y)	.568 .575 .630 .623	.425 SL ^{4/} SL ^{4/} .370
Blue (B)	.230 .230 .320 .320	.350 .420 .350 .420
Lunar white (D)	.400 .400 .460 .460	.380 .420 .380 .420

- ^{1/} See MIL-L-85762 for chromaticity limits of NVIS compatible displays.
- ^{2/} The chromaticities of the colors are expressed as "x" and "y" coordinates on the 1931 CIE chromaticity diagram and are within limits bound by the coordinates listed for each color. Chromaticity values are obtained when switch is illuminated by four T-1 subminiature flange base lamps of .15 ±.01 mean spherical candlepower at 2250°K ±100°K.
- ^{3/} Meets aviation color requirements of SAE-AS25050.
- ^{4/} Where intersection occurs with the spectrum locus on the CIE chromaticity diagram.

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Part or Identifying Number (PIN): PIN's are assigned as shown in the following example:



In the preceding example, PIN M22885/110AB1H identifies a momentary action switch for mounting in a .032 to .149 inch thick panel, with dripproof seal, EMI/RFI shielding, sunlight readable full face display, illuminating in NVIS green A.

TABLE III. Code letters for switch action and panel thickness.

Code	Switch action	Panel thickness
A	Momentary	.030 to .149 inch (0.76 to 3.78 mm)
B	Alternate, position indicating	.030 to .149 inch (0.76 to 3.78 mm)
C	Indicator light	.030 to .149 inch (0.76 to 3.78 mm)
D	Momentary	.150 to .282 inch (3.81 to 7.16 mm)
E	Alternate, position indicating	.150 to .282 inch (3.81 to 7.16 mm)
F	Indicator light	.150 to .282 inch (3.81 to 7.16 mm)

TABLE IV. Code letters for seal, display type, and EMI/RFI shielding.

Code	Seal	Display type	EMI/RFI shielding
A	Dripproof	S	No
B	Dripproof	S	Yes
C	Unsealed	S	No
D	Unsealed	S	Yes

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TABLE V. Display configuration and color sequence.

Display code ^{1/}	Display	Display code ^{1/}	Display								
1XX	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">1</td> </tr> </table>	1	5XX	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> </table>	1	2	3				
1											
1											
2	3										
2XX	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">2</td> </tr> </table>	1	2	6XX	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">3</td> <td></td> </tr> </table>	1	2	3			
1											
2											
1	2										
3											
3XX	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> </tr> </table>	1	2	7XX	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> </tr> <tr> <td></td> <td style="text-align: center;">3</td> </tr> </table>	1	2		3		
1	2										
1	2										
	3										
4XX	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> </tr> <tr> <td colspan="2" style="text-align: center;">3</td> </tr> </table>	1	2	3		8XX	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> </tr> </table>	1	2	3	4
1	2										
3											
1	2										
3	4										

^{1/} Display codes are shown for lamp capsules without color filters. Replace X's with the color symbols of table I in the sequence shown.

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Qualification:

Group inspection: See table VI.

Group A inspection: For seal testing, only external examination of the seal is required.

TABLE VI. Qualification inspection - group submission.

MIL-S-22885 qualification inspection table		PIN	Extent of qualification
Group	Quantity to be tested		
I	All samples	All samples	All PINs
II <u>1/</u>	2 2	M22885/110AB1W M22885/110BB1W	
III	1 1	M22885/110AB1W M22885/110BB1W	
IV	2	M22885/110AB1W	
V	2	M22885/110AB1W	
VI	8 <u>2/</u>	M22885/110AB1W	
VII <u>3/</u>	4	M22885/110AB1W	
VIII <u>4/ 5/</u>	9 (1 each color) 9 (1 each color)	M22885/110CC1X M22885/110CD4XXX	

- 1/ During tests requiring switches to be mounted, one-half of the sample units shall be mounted with the mounting spacer in front of panel. The remaining half shall be mounted with the mounting spacer discarded or behind panel, as necessary.
- 2/ Four samples for resistive load and four samples for inductive load testing.
- 3/ Two samples for low level life and two additional samples for logic level endurance. The low level endurance test shall be substituted for mechanical endurance in the group VII test sequence. (mechanical endurance testing is not required).
- 4/ NVIS color and NVIS radiance measurements shall be taken where applicable during the illuminated color portion of the test sequence.
- 5/ Includes one sample each of NVIS green A, NVIS green B, NVIS yellow, and NVIS red.

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Application information:

Recommended mounting torque: 18 ±2 inch-ounces.

Category II product offerings are as follows. Category II product offerings must meet all applicable design, construction, material and performance requirements of MIL-PRF-22885 and MIL-PRF-22885/110:

Display types N ,W, or C

T-1 LED Illumination

MIL-S-22885/101 colors

Custom lamp circuits

5 ampere termination systems:

18 pin, double turret solder terminal

18 pin, PCB, .030 inch terminal

18 pin, MIL-C-39029/57-354 connector system

Mounting systems:

Multiple channel matrix

Single channel matrix

Reference Documents:

MIL-PRF-22885

MIL-C-39029/1

MIL-C-39029/57

MIL-L-85762

MIL-STD-202

SAE-AS25050

Custodian:
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

(Project 5930-1785)