

INCH-POUND

MIL-PRF-22885/101D
w/Amendment 1
2 February 2004

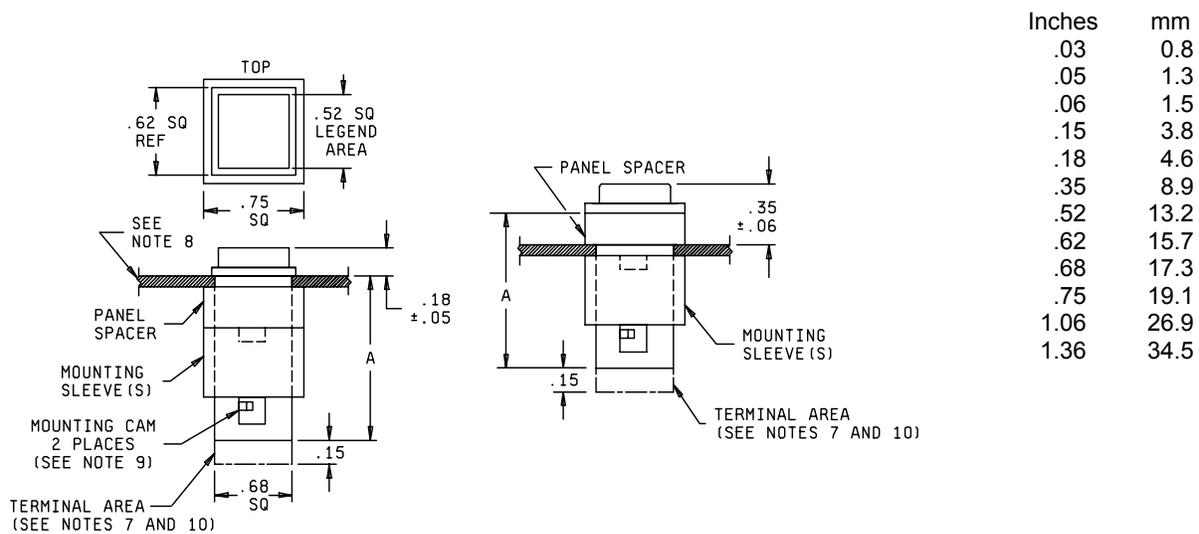
SUPERSEDING
MIL-PRF-22885/101D
1 March 2001

PERFORMANCE SPECIFICATION SHEET

SWITCH, PUSHBUTTON, ILLUMINATED, 4-LAMP, SPDT AND DPDT,
5.0 AMPERES SILVER CONTACTS, 1 AMPERE MAX. GOLD CONTACTS,
DRIPPROOF, SUNLIGHT READABLE, EMI/RFI SHIELDED, NVIS COMPATIBLE

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.



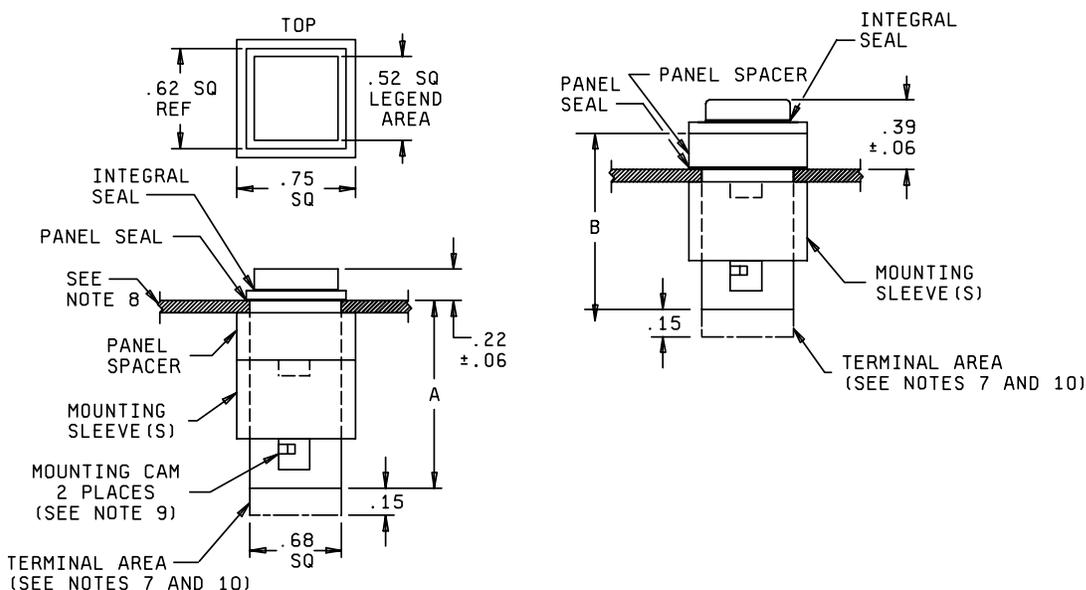
	Dim. A
Short version (Inactive for new design)	1.06 MAX
Extended version	1.36 MAX

NOTES:

- Dimensions are in inches.
- Metric equivalents are given for general information only.
- Unless otherwise specified, tolerances $\pm .03$ ($\pm .8$ mm).
- Pushbutton shall be designed to prevent incorrect insertion into switch housing.
- Pushbutton shall be held captive to switch body by retaining element to prevent accidental interchange.
- Exact shape of switch optional provided that dimensions specified are not exceeded.
- Solder lug terminals shall be turreted.
- Switches shall be capable of mounting in panel thicknesses of .030 to .250 inch (.8 to 6.4 mm).
- Mounting cams may be located top and bottom (as shown) or on sides.
- Printed circuit and plug-in versions are category II items and are available from sources listed on the qualified products list. See MIL-S-24317 for multistation versions.

FIGURE 1. Switch, unsealed.

MIL-PRF-22885/101D
w/Amendment 1



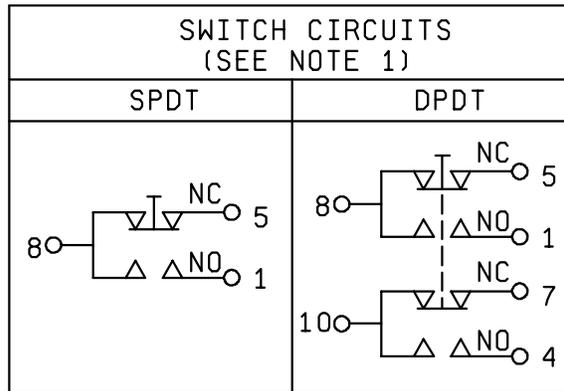
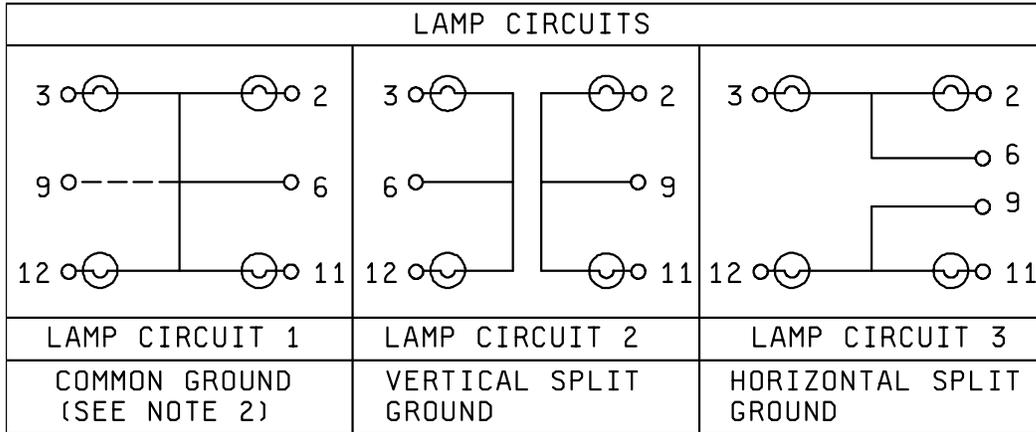
Inches	mm	Inches	mm	Inches	mm
.01	0.3	.25	6.4	.75	19.1
.03	0.8	.39	9.9	1.03	26.2
.06	1.5	.52	13.2	1.06	26.9
.15	3.8	.62	15.7	1.33	33.8
.22	5.6	.68	17.3	1.36	34.5

	Dim. A	Dim. B
Short version (Inactive for new design)	1.03 MAX	1.06 MAX
Extended version	1.33 MAX	1.36 MAX

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are ± 0.03 (± 0.8 mm).
4. Pushbutton shall be designed to prevent incorrect insertion into switch housing.
5. Pushbutton shall be held captive to switch body by retaining element to prevent accidental interchange.
6. Exact shape of switch optional provided that dimensions specified are not exceeded.
7. Solder lug terminals shall be turreted.
8. Switches shall be capable of mounting in panel thicknesses of .030 to .250 inch (.8 to 6.4 mm).
9. Mounting cams may be located top and bottom (as shown) or on sides.
10. Printed circuit and plug-in versions are category II items and are available from sources listed on the qualified products list. See MIL-S-24317 for multistation versions.

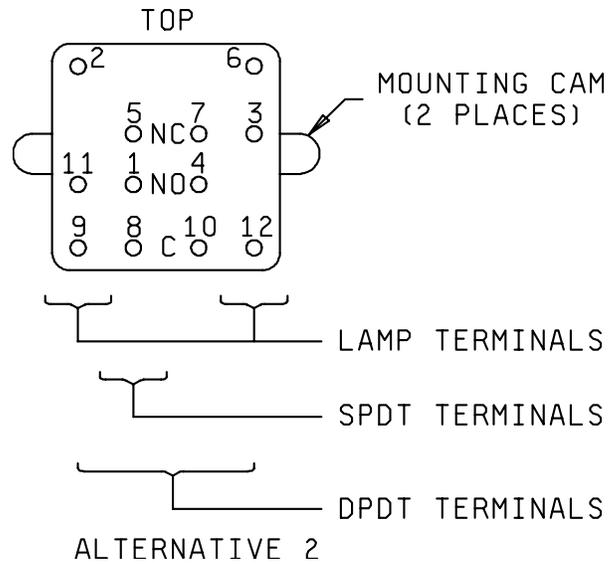
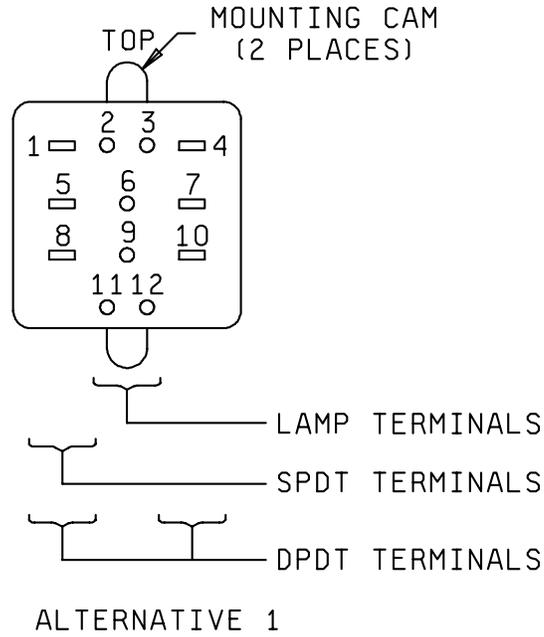
FIGURE 2. Switch, dripproof sealed.



NOTES:

1. Switch mechanism may incorporate either single-break or double-break contacts.
2. Common ground lamp circuit may include optional terminal 9 in addition to terminal 6.

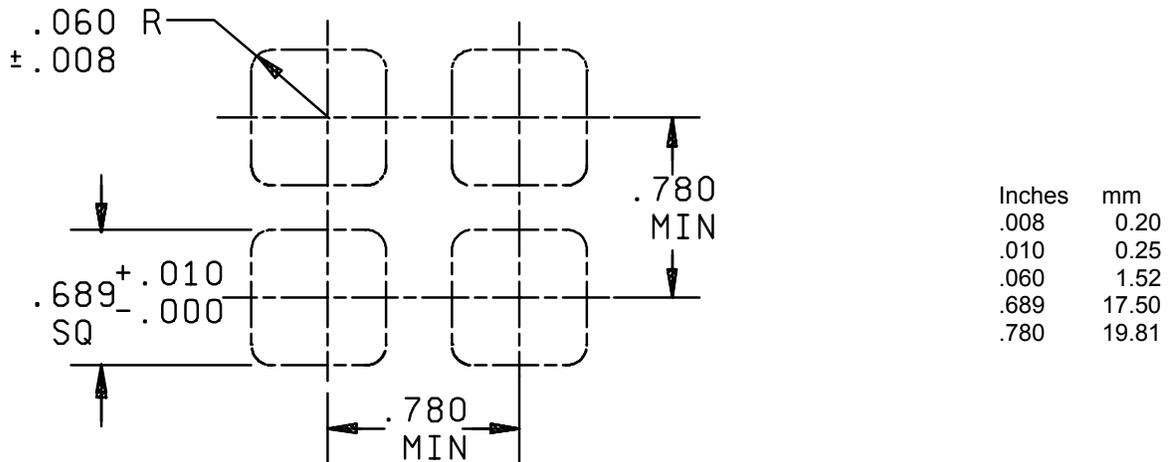
FIGURE 3. Lamp and switch circuit identification.



NOTE: Nonfunctional terminals are not supplied.

FIGURE 4. Solder terminal layout - rear view.

MIL-PRF-22885/101D
w/Amendment 1



NOTES:

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

FIGURE 5. Recommended panel cutout pattern.

REQUIREMENTS:

Dimensions and configurations: See figures 1 through 5.

Complete switch shall consist of:

- 1 Pushbutton: Includes front lens, color filters, lens retainer, and lamp box. Divider, integral seal and EMI/RFI shielding provisions shall be provided when specified.
- 1 Switch body: Includes 1 or 2 MIL-PRF-8805/4, MIL-PRF-8805/101 or MIL-PRF-8805/109 basic switches listed on QPL-8805. Also includes mounting sleeves, panel spacer, and panel seal as specified.
- 4 Lamps: T-1 submidjet flange base, not included. Order separately or specify on contract or purchase order. See lamp application information.

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

Weight: 0.05 pound maximum.

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

MIL-PRF-22885/101D
w/Amendment 1

Vibration grade: 3 (10-2000 Hz).

Operation: A (momentary action), E (alternate action, position indicating), or H (indicator light only).

Operating characteristics:

Actuation force: 5 pounds (22.2 N) maximum.

Actuation travel: .130 ±.030 inch (3.3 ±0.76 mm).

Pushbutton extraction force: 2 to 5 pounds (8.9 to 22.2 N).

Shock: 75 G (MIL-STD-202, method 213, test condition B).

Electrical endurance: See tables I and II for electrical load conditions. Following electrical endurance, contact resistance is not applicable for switches which are tested at the rated inductive load.

Low level life: Applicable for gold contact switches. 50,000 cycles.

EMI/RFI shielding: When applicable, switches shall meet either the shielding efficiency or positive grounding test requirements of MIL-PRF-22885, except the screen to mounting surface resistance shall not exceed 3 ohms.

Sunlight readability: Applicable to display type S switches, see table VIII. Units shall be tested for $\phi_1 = 45^\circ$ and $\phi_2 = 0^\circ$ only. This procedure does not test readability under specularly reflective (glare) condition. The average contrast ratio of each lighted legend character to the background shall be 0.6 minimum for standard colors and 0.4 minimum for NVIS compatible colors. In the unlighted legend condition, the average contrast ratio of each legend character to the background shall have an absolute value less than or equal to 0.1. The legend used for testing shall have a character height of approximately 0.09 to 0.1 inch. The stroke width shall be characteristic of each manufacturer's standard military product.

Night vision imaging system (NVIS) compatibility: Applicable to NVIS color displays. The night vision goggle compatible feature, when specified for type S displays, is in addition to the sunlight readable feature and all minimum sunlight readable requirements shall be maintained on all type S displays along with the unique requirements for night vision goggle compatibility.

Color and luminance: See tables III and IV.

MIL-PRF-22885/101D
w/Amendment 1

TABLE I. Electrical ratings - silver contacts.

Load	Sea level, 28 V dc	70,000 feet, 28 V dc
	NO or NC (amperes, max)	NO or NC (amperes, max)
Resistive	5.0	5.0
Inductive	3.0	2.0
Lamp	1.0	1.0

TABLE II. Electrical ratings - gold plated contacts. 1/

Load	Sea level, 28 V dc (amperes, max)	70,000 feet, 28 V dc (amperes, max)
Resistive	1	0.5
Inductive	0.5	0.5

1/ Low level life requirements also are applicable.

MIL-PRF-22885/101D
w/Amendment 1

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

Color	x ^{2/}	y ^{2/}
Red (R)	.665 .659 .707 .713	SL ^{3/} .335 .287 SL ^{3/}
Green (G)	.300 .300 .365 .365	.560 SL ^{3/} .560 SL ^{3/}
Aviation green (Z)	.140 .290 .030 .185	.470 .470 SL ^{3/} SL ^{3/}
Aviation yellow (Y)	.568 .575 .630 .623	.425 SL ^{3/} SL ^{3/} .370
Blue (B)	.250 .250 .330 .330	.330 .420 .330 .420
White (W)	.480 .480 .540 .540	.395 .435 .431 .391
Lunar white (D)	.400 .400 .480 .480	.375 .420 .375 .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 the limits bound by the coordinates listed for each color. Chromaticity values are obtained when switch is illuminated by 4 (T-1 midget-flange base) subminiature lamps of .15±.01 mean spherical candlepower (MSCP) at 5 V dc, 2,350 K.

^{3/} Where intersection occurs with the spectrum locus on the CIE chromaticity diagram.

MIL-PRF-22885/101D
w/Amendment 1

TABLE IV. Luminance.

Display type	Color	Color code	Foot-lamberts	
			1/ 2/	
			Without EMI/RFI requirement	With EMI/RFI requirement
N	Aviation yellow	Y	200	100
N	Red	R	50	25
N	Green	G	40	20
N	Aviation green	Z	40	20
N	White	W	300	150
N	Lunar white	D	250	150
N	Blue	B	25	12
N	NVIS green A	H	0.5 to 3.0	0.5 to 3.0
N	NVIS green B	J	0.5 to 3.0	0.5 to 3.0
W	Aviation yellow	Y	350	175
W	Red	R	70	35
W	Green	G	50	25
W	Aviation green	Z	50	25
W	White	W	350	175
W	Lunar white	D	300	175
W	Blue	B	30	12
S	Aviation yellow	Y	275	225
S	Red	R	185	150
S	Green	G	185	150
S	Aviation green	Z	250	200
S	White	W	275	225
S	Lunar white	D	250	200
S	Blue	B	185	--- ^{3/}
S	NVIS green A	H	100	100
S	NVIS green B	J	150	150
S	NVIS yellow	K	150	150
S	NVIS red	L	80	80
C	Yellow	Y	350	175
C	Red	R	80	40
C	Green	G	60	30
C	Aviation green	Z	60	30
C	White	W	350	175
C	Lunar white	D	300	175
C	Blue	B	40	20

^{1/} Minimum average.

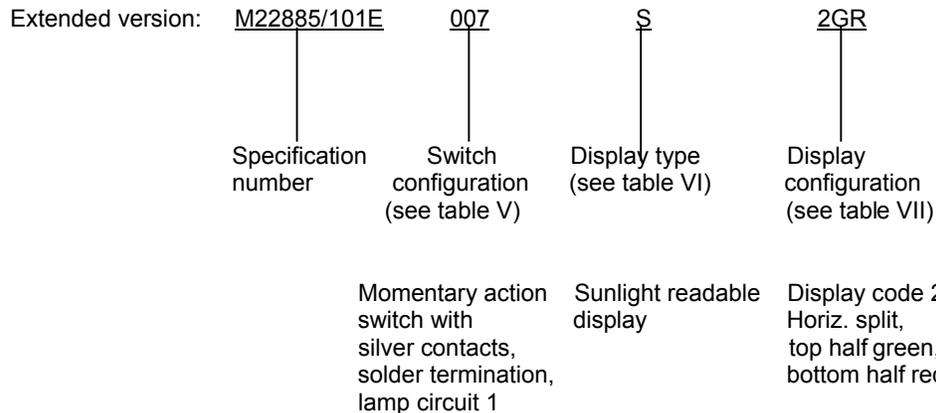
^{2/} When illuminated by 4 (T-1 midget-flange base) subminiature lamps of .15 ±.01 mean spherical candlepower (MSCP) at 5 V dc, 2350°K.

^{3/} Not recommended in blue.

MIL-PRF-22885/101D
w/Amendment 1

Part or Identifying Number (PIN): PINS for complete switches are assigned as follows: Short version switches are inactive for new design.

Short version: M22885/101- 007 S 2GR
(Inactive for new design)



These PIN's do not include lamps or legends. Switches with legend information shall be acquired through Defense Supply Center Columbus (CAGE 037Z3) drawing 90020.

Configuration dash numbers for switches with plug-in terminations, -113 through -168, have been canceled; and configuration dash numbers for switches with PCB pin terminations, -001, -002, -005, -006, -009, -010, -013, -014, -017, -018, -021, -023, -025, -027, -029, -030, -033, -034, -037, -038, -041, -042, -045, -046, -049, -051, -053, -055, -057, -058, -061, -062, -065, -066, -069, -070, -073, -074, -077, -079, -081, -083, -085, -086, -089, -090, -093, -094, -097, -098, -101, -102, -105, -107, -109, and -111, have been canceled. Switches with plug-in and printed circuit board (PCB) mount pin terminations are considered category II parts and shall be acquired from a source listed on QPL-22885 for MIL-PRF-22885/101. Category II PCB mount switches may not be interchangeable between manufacturers due to variations in pin location.

Spare parts PIN: PIN's for mounting sleeve, panel spacer, panel seal, and switch housing (without pushbutton) are listed in tables VIII and IX, and are inactive for new design.

MIL-PRF-22885/101D
w/Amendment 1

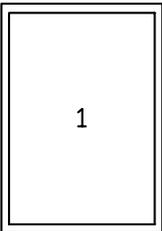
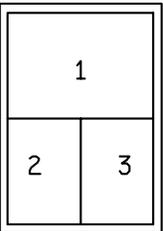
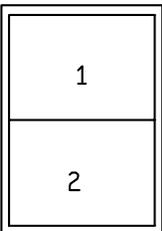
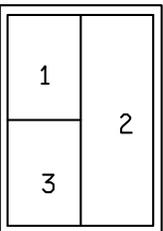
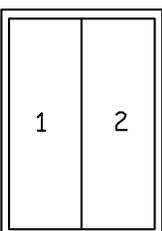
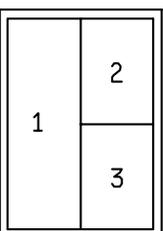
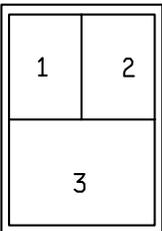
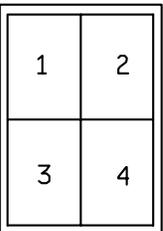
TABLE V. Switch configuration dash number.

Indicator light	SPDT		DPDT		Lamp circuit (see figure 3)
	Silver contacts	Gold contacts	Silver contacts	Gold contacts	
Momentary action					
Unsealed, no RFI shielding					
003	007	011	015	019	1
169	170	171	172	173	2
004	008	012	016	020	3
Dripproof seal, no RFI shielding					
031	035	039	043	047	1
174	175	176	177	178	2
032	036	040	044	048	3
Unsealed, RFI shielding					
059	063	067	071	075	1
179	180	181	182	183	2
060	064	068	072	076	3
Dripproof seal and RFI shielding					
087	091	095	099	103	1
184	185	186	187	188	2
088	092	096	100	104	3
Alternate action (position indicating)					
No seal, no RFI shielding					
022	024	026	028		1
189	190	191	192		2
193	194	195	196		3
With seal, no RFI shielding					
050	052	054	056		1
197	198	199	200		2
201	202	203	204		3
With RFI shielding, No seal					
078	080	082	084		1
205	206	207	208		2
209	210	211	212		3
With seal and RFI shielding					
106	108	110	112		1
213	214	215	216		2
217	218	219	220		3

TABLE VI. Display type.

Display type	Description
N	LIGHTED LETTERS. Legends appear white on a black background until illuminated and then legends appear in color, background remains black.
W	LIGHTED BACKGROUND. Legends appear black on a white background until illuminated and then background appears in color, legends remain black.
S	SUNLIGHT READABLE. Legends are not legible until illuminated and then legends appear in color, background remains black. When illuminated, lighted legends are readable in direct sunlight.
C	COLORED BACKGROUND. Legends appear black against a colored background until illuminated and then background appears in lighted color, legends remain black.

TABLE VII. Display configuration and color sequence.

DISPLAY CODE <u>1/</u>	DISPLAY	DISPLAY CODE <u>1/</u>	DISPLAY
1X		5XXX	
2XX		6XXX	
3XX		7XXX	
4XXX		8XXXX	

1/ Display codes are shown for lamp capsules without color filters. Replace X's with the color codes of table IV in the sequence shown.

MIL-PRF-22885/101D
w/Amendment 1

TABLE VIII. Inactive PIN's - switch housing (without pushbutton). 1/

PIN 2/ M22885/101- or M22885/101E			Action	Contact material	Switch circuit	Lamp circuit
Terminal type						
PCB	Solder	Plug-in				
501	503	529	Indicator	N/A	N/A	1
502	504	530	Indicator	N/A	N/A	3
505	507	531	Momentary	Silver	SPDT	1
506	508	532	Momentary	Silver	SPDT	3
509	511	533	Momentary	Gold	SPDT	1
510	512	534	Momentary	Gold	SPDT	3
513	515	535	Momentary	Silver	DPDT	1
514	516	536	Momentary	Silver	DPDT	3
517	519	537	Momentary	Gold	DPDT	1
518	520	538	Momentary	Gold	DPDT	3
521	522	539	Alternate	Silver	SPDT	1
523	524	540	Alternate	Gold	SPDT	1
525	526	541	Alternate	Silver	DPDT	1
527	528	542	Alternate	Gold	DPDT	1

1/ These inactive PIN's define switch housings which mate with MIL-PRF-22885/102 pushbuttons (plug-in versions also mate with MIL-S-24317/11 housings). Does not include mounting sleeve, panel spacer or panel seal.

2/ Use of "E" instead of a dash indicates extended version. See figures 1 and 2.

TABLE IX. Inactive PIN's - mounting hardware. 1/

Short version M22885/101-	Extended version M22885/101-	Description
543	543	Mounting sleeve
544	2/	Panel spacer
545	2/	Panel seal

1/ These inactive PIN's define mounting hardware for switch housings of table VIII.

2/ Extended version uses same panel spacer and panel seal as short version.

MIL-PRF-22885/101D
w/Amendment 1

Qualification:

Group submission: See table X. At the discretion of the qualifying activity, qualification to short version switches may be extended by similarity to cover extended version switches except for groups I, II, VII, and VIII testing. Short version switches may be qualified to extended version PIN's.

Group A inspection:

Seal: Visual in-process inspection of seal.

Group B inspection:

Group submission: Color and luminance testing need be performed on display type S versions only.

TABLE X. Qualification inspection - group submission.

Switch	MIL-S-22885 qualification inspection table		Extent of approval	
	Group	Number of switches		
M22885/101E112S1J	I II <u>1/</u> III IV <u>2/</u> VI <u>3/</u> VII <u>1/ 4/</u>	All 4 2 2 2 for each load 4	Extended version	All parts
M22885/101E016S1J	I II <u>1/</u> IV <u>2/</u> V VI <u>5/</u>	All 4 2 2 2 for each load		
M22885/101E003N8XXXX <u>6/</u> W8XXXX <u>6/</u> S8XXXX <u>6/</u> C8XXXX <u>6/</u>	VIII	14 (2 of each color) <u>7/</u> 10 (2 of each color) 18 (2 of each color) <u>8/</u> 10 (2 of each color)		
M22885/101-112S1J	I II <u>1/</u> III IV <u>2/</u> VI <u>3/</u> VII <u>1/ 4/</u>	All 4 2 2 2 for each load 4	Short version	
M22885/101-016S1J	I II <u>1/</u> IV <u>2/</u> V VI <u>5/</u>	All 4 2 2 2 for each load		
M22885/101-003N8XXXX <u>6/</u> W8XXXX <u>6/</u> S8XXXX <u>6/</u> C8XXXX <u>6/</u>	VIII <u>9/</u>	14 (2 of each color) <u>7/</u> 10 (2 of each color) 18 (2 of each color) <u>8/</u> 10 (2 of each color)		

See footnotes at top of next page.

MIL-PRF-22885/101D
w/Amendment 1

TABLE X. Qualification inspection - group submission - Continued.

- 1/ During tests requiring switch to be mounted, one-half of the sample units shall be mounted with mounting spacer in front of panel. The remaining half shall be mounted with the mounting spacer behind panel.
- 2/ These tests are not required if switch elements are category I or II basic sensitive switches listed on QPL-8805.
- 3/ Sea level resistive load only, provided that switch elements are category I or II basic sensitive switches listed on QPL-8805.
- 4/ Low level circuit testing is not required if basic switch elements have been qualified to 50,000 cycles of low level and are listed on QPL-8805.
- 5/ Sea level inductive load only, provided that switch elements are category I or II basic sensitive switches listed on QPL-8805.
- 6/ A single separate switch body may be used to individually energize pushbuttons of each color.
- 7/ Includes 2 samples each of NVIS Green A and NVIS Green B.
- 8/ Includes 2 samples each of NVIS Green A, NVIS Green B, NVIS Yellow, and NVIS red.
- 9/ Group VIII testing is not required for identical pushbutton capsules qualified to the same requirements under other MIL-PRF-22885 specification sheets.

APPLICATION INFORMATION:

Industry Lamp Number 6180 or 3071 is recommended (5 volt, .060 amps, .15 MSCP, 2,350 K). Other lamps are available with various power requirements and illumination results. When using higher wattage lamps, additional heat sinking and air flow must be provided (use extended version of switch).

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-22885/101:

Custom lamp circuits.

Switches with printed circuit board terminals.

Switches with plug-in terminals.

The margins of this specification are marked with vertical lines to indicate where modifications from this amendment were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

Reference Documents

MIL-PRF-8805/4	MIL-S-24317
MIL-PRF-8805/101	MIL-S-24317/11
MIL-PRF-8805/109	MIL-L-85762
MIL-PRF-22885	MIL-STD-202
MIL-PRF-22885/102	QPL-8805

Custodian:
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

(Project 5930-1787)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at www.dodssp.daps.mil.