INCH-POUND
MIL-DTL-83731/21B
2 July 2010

SUPERSEDING
MIL-S-83731/21A
20 March 1987

DETAIL SPECIFICATION SHEET

SWITCHES, TOGGLE, MINIATURE, LEVER SEAL, PANEL SEAL, FOUR POLE LOGIC LOAD TO 5 AMPERES

Inactive for new design after 4 May 2003

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 sheet and MIL-DTL-83731.

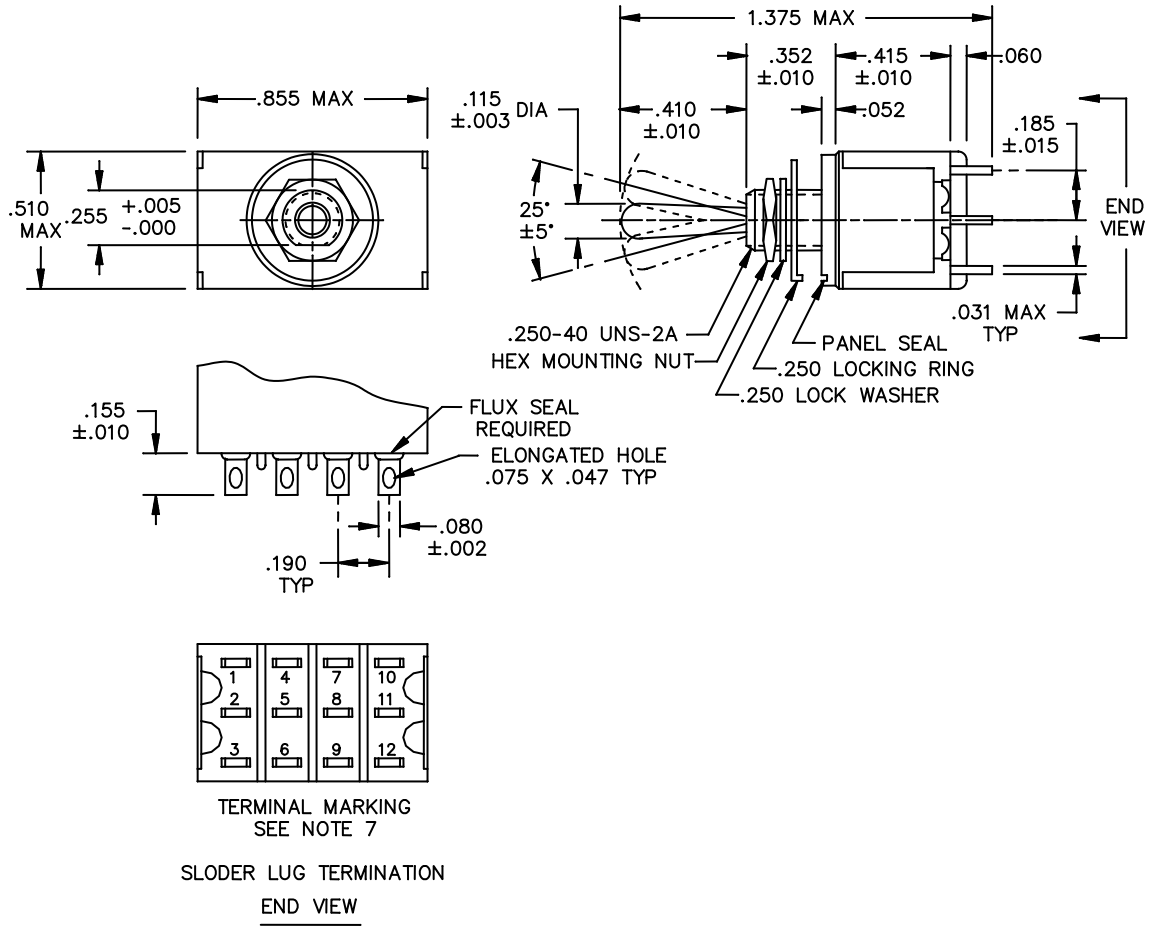
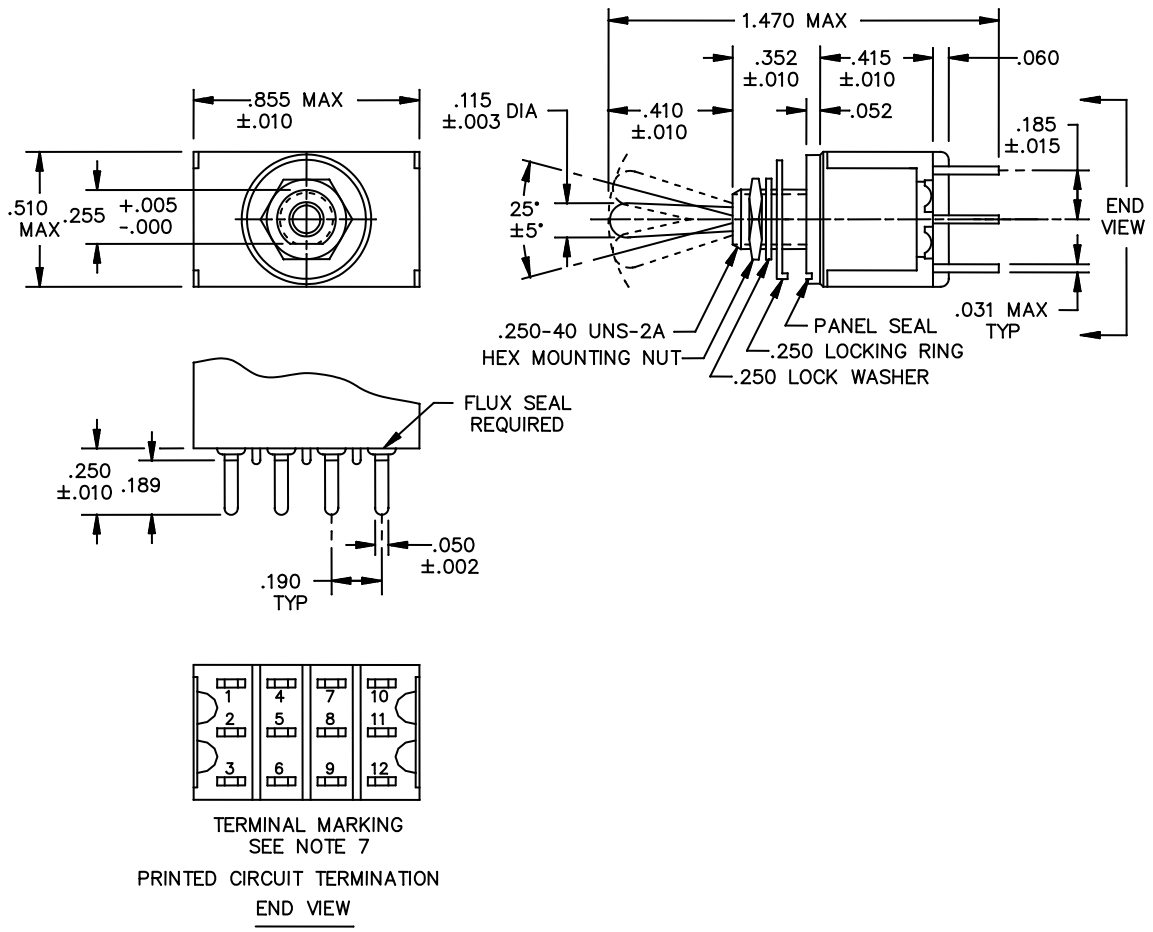
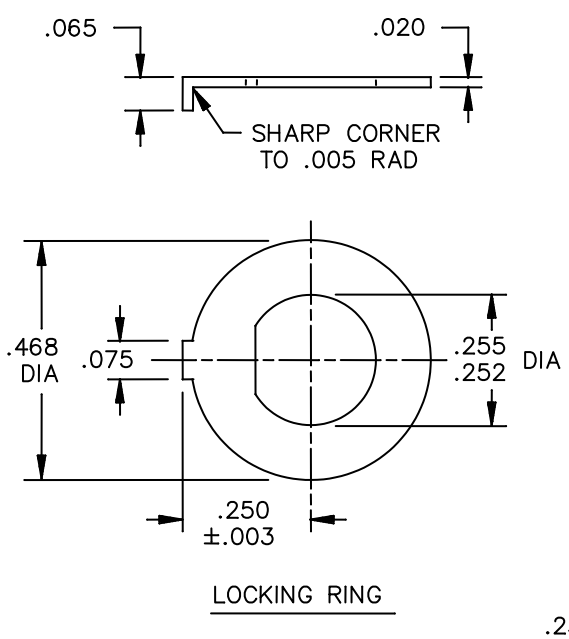


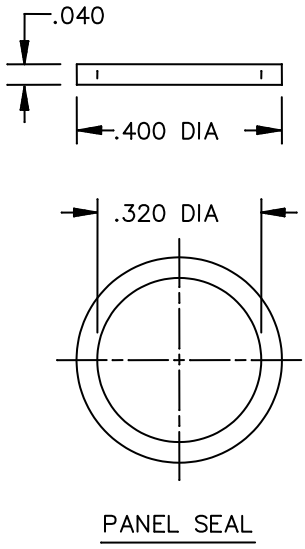
FIGURE 1. Dimensions and configurations.

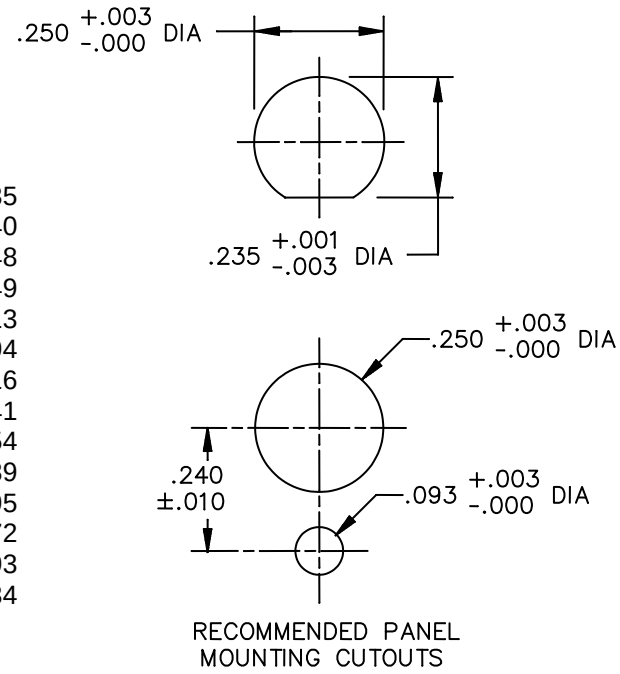


PRINTED CIRCUIT TERMINATION

FIGURE 1. Dimensions and configurations – Continued.







Inches	mm	Inches	mm	Inches	mm
.001	0.03	.075	1.91	.250	6.35
.002	0.05	.080	2.03	.252	6.40
.003	0.08	.093	2.36	.255	6.48
.005	0.13	.115	2.92	.295	7.49
.010	0.25	.155	3.94	.320	8.13
.020	0.51	.185	4.70	.352	8.94
.031	0.78	.189	4.80	.400	10.16
.040	1.02	.190	4.83	.410	10.41
.046	1.17	.225	5.72	.415	10.54
.047	1.19	.232	5.89	.468	11.89
.052	1.32	.234	5.94	.510	12.95
.060	1.52	.235	5.97	.855	21.72
.065	1.65	.240	6.10	1.375	34.93
				1.470	37.34

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise specified, tolerance is ± .005 (0.13 mm).
4. Direction of internal mechanism movement is opposite to direction of toggle movement.
5. Mounting bushing is D-shaped.
6. To insure proper sealing by panel seal, locking ring should be used on front of panel only.
7. Terminal identification may be marked on sides of switch body. Terminal numbers 4 through 9 need not be identified.

FIGURE 1. Dimensions and configurations – Continued.

REQUIREMENTS:

Dimensions and configuration: See figures 1 and 2.

Material and finish: Bushing shall be brass, nickel plated. Toggle lever shall be brass, bright chrome plated. Frame shall be stainless steel. The contacts shall be gold plate over nickel over silver over brass.

Mounting hardware: Each switch shall be supplied with one hexagon nut and one internal-tooth lockwasher in accordance with the appendix of MIL-DTL-83731, one locking ring (see figure 3), and one
panel seal (see figure 3). The panel seal shall be silicone rubber.

Weight: .02 pound maximum.

Electrical ratings: See table I.

Strength of terminals: Method 211 of MIL-STD-202, test condition A. The applied force shall be one pound.

Strength of toggle lever, pivot, and lever stop: Test (a) shall use a 10 pound load; test (b) shall use a 8 pound load.

Dielectric withstanding voltage: Test at atmospheric pressure only.

Mechanical endurance: 10,000 cycles at -25°C +0°C, -4°C, and 10,000 cycles at 71°C +4°C, -0°C.

Electrical endurance, electrical overload, electronic logic, and temperature rise: Multipole switches are to be tested with a load on each pole and with the same polarity on adjacent poles in accordance with figure 2.

High level resistive load (dc and ac): 10,000 cycles. Altitude testing not applicable.

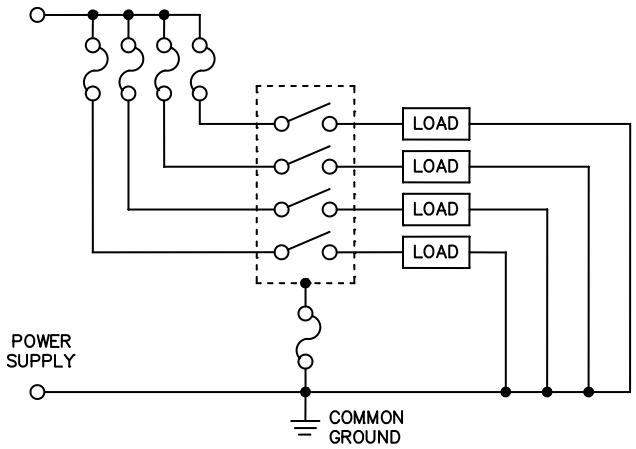


FIGURE 2. Test circuit.

TABLE I. Electrical ratings.

Type of load	High level (current in amperes)			Logic level
	28 V dc	125 V ac, 60 Hz	115 V ac, 400 Hz	5 V dc
Resistive	5	5	5	0.010 ampere
Inductive	2	2	2	--
Lamp	1	1	1	--

Logic level load: 10,000 cycles, tested in accordance with ANSI/EIA RS-448, method 17. Rate of actuation in accordance with MIL-DTL-83731 electrical endurance. Fifty percent of test cycles at room ambient conditions. Fifty percent of test cycles at 71°C, +4°, -0°C. No “sticks” or “misses” allowed.

Inductive load (dc and ac): 10,000 cycles. Altitude testing not applicable.

Lamp load: Switches shall make and break the rated lamp load for 10,000 operating cycles.

Intermediate current: Not applicable.

Short circuit: Use 100 amperes at 28 V dc.

Flux sealed: The sealing is obtained when the base is sealed to prevent flux from entering the switch case during the wave soldering process.

Flux seal test: Three additional switches shall be tested as follows during qualification and group B inspection: Measure and record initial contact resistance. Place switches, terminals down, into a shallow pan. Pour flux at 80°F ±5°F, type RMA of J-STD-004, specific gravity 0.896, into pan without splashing until level of flux is approximately 1/16 inch above the bottom of the plastic switch case and let switches soak for 10 minutes. Remove switches from flux, clean with flux cleaning solvent and immediately put into oven for drying at 175°F for two hours. After switches have cooled to room temperature, repeat initial measurement. Contact resistance shall not increase by more than 10 milliohms over the initial reading. Disassemble and visually examine the contact area for evidence of flux. Any evidence of flux shall be cause for rejection.

Part number: The part number shall consist of the prefix M83731/21followed in order by the appropriate two-digit number from table II and the number from table III as shown in the following example:

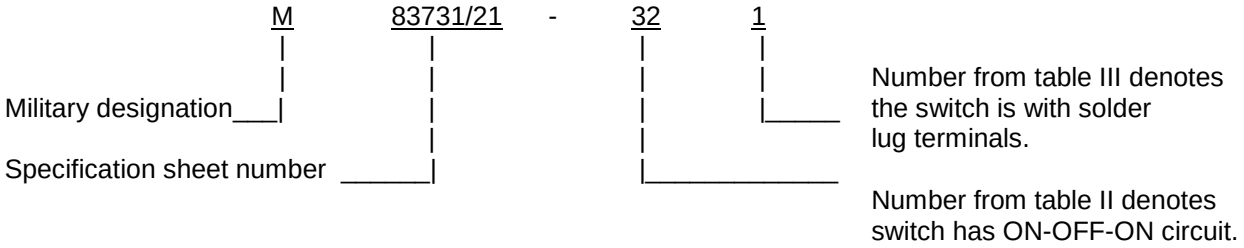


TABLE II. Circuit for switching characteristic.

Circuit 1/	Circuit with toggle in								
	Toward flat (down position)			Center			Opposite flat (up position)		
21	1-2	ON	7-8	OFF			2-3	ON	8-9
	4-5		10-11				5-6		11-12
23	1-2	ON	7-8	NONE			2-3	ON	8-9
	4-5		10-11				5-6		11-12
26	1-2	MOM-ON	7-8	NONE			2-3	ON	8-9
	4-5		10-11				5-6		11-12
27	1-2	MOM-ON	7-8	OFF			2-3	MOM-ON	8-9
	4-5		10-11				5-6		11-12
31	1-2	MOM-ON	7-8	OFF			2-3	ON	8-9
	4-5		10-11				5-6		11-12
32	1-2	ON	7-8	2-3	2-3	8-9	2-3	ON	8-9
	4-5		10-11	4-5		10-11	5-6		11-12
33	1-2	MOM-ON	7-8	2-3	2-3	8-9	2-3	ON	8-9
	4-5		10-11	4-5		10-11	5-6		11-12
34	1-2	MOM-ON	7-8	2-3	ON	8-9	NONE		
	4-5		10-11	5-6		11-12			
35	1-2	MOM-ON	7-8	2-3	ON	8-9	2-3	ON	8-9
	4-5		10-11	4-5		10-11	5-6		11-12

1/ Circuit numbers 32, 33, and 35 replace and are interchangeable with circuits previously identified as 41, 42, and 43 respectively.

TABLE III. Termination type.

Solder lug	1
Printed circuit	2

Reference Documents

MIL-DTL-83731	ANSI/EIA RS-448
MIL-STD-202	J-STD-004

The margins of this specification are marked with vertical lines to indicate where modifications from this revision 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.

Custodians:
Navy - EC
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

(Project 5930-2008-053)

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 https://assist.daps.dla.mil/ .