

MILITARY SPECIFICATION SHEET

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

This specification is approved for use by the Department of the Air Force, and is available 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 the latest issue of MIL-S-83731.

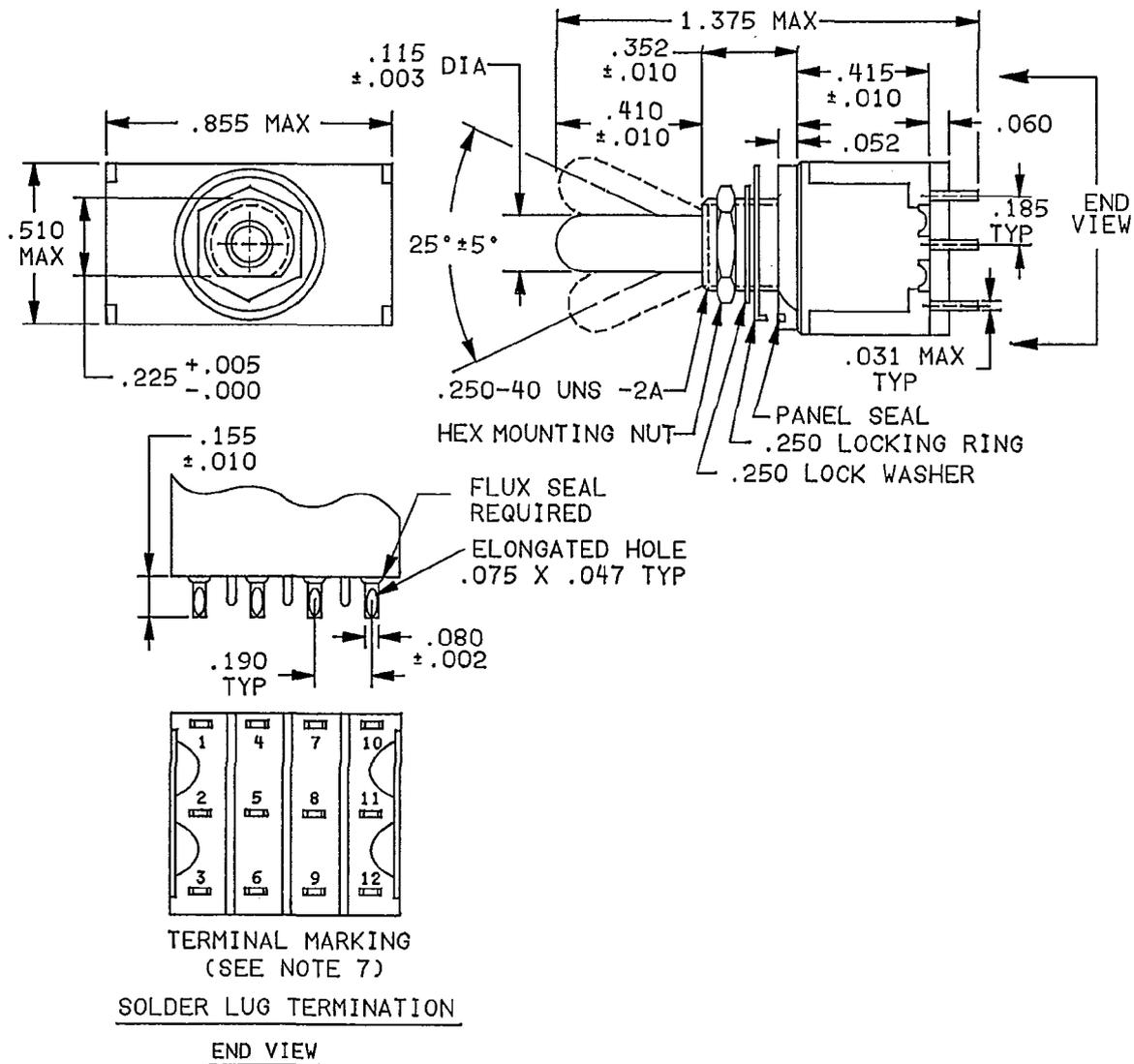


FIGURE 1. Dimensions and configurations.

(A) denotes changes

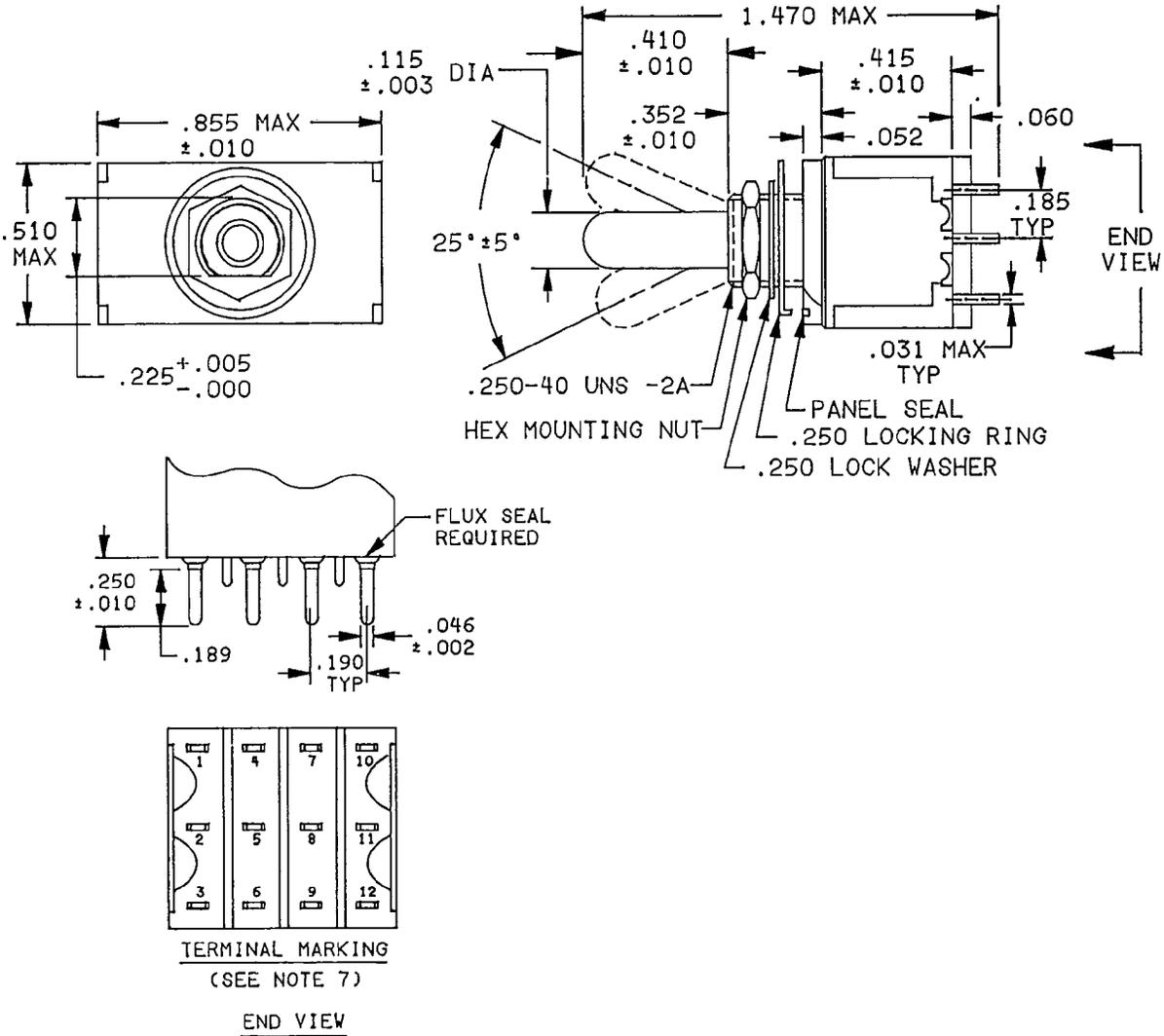
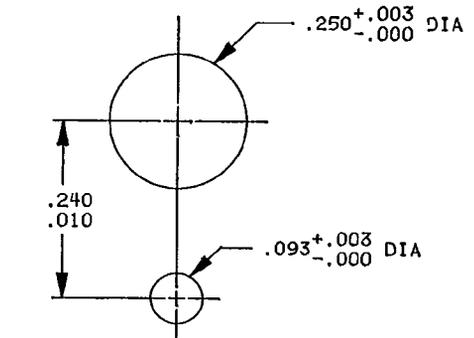
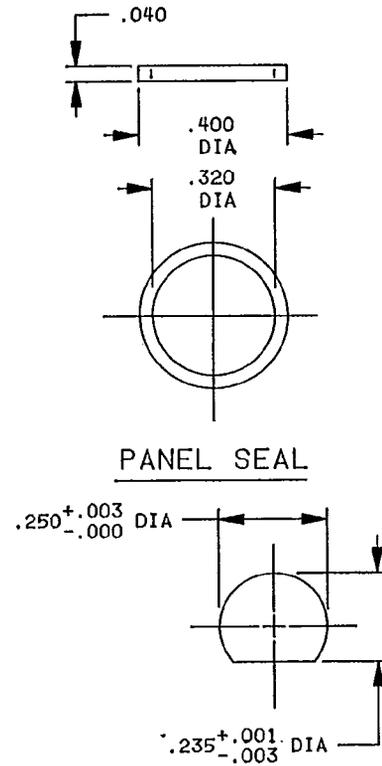
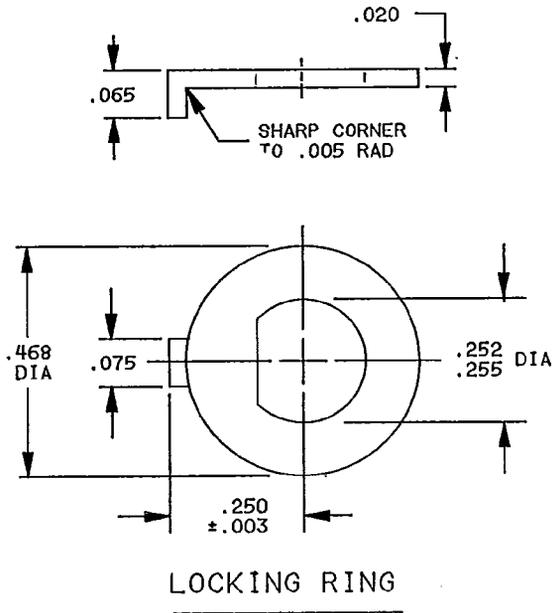


FIGURE 1. Dimensions and configurations - Continued.



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 general information only.
3. Unless otherwise specified, tolerance is ±.005 (0.13 mm).
4. Directions 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 configurations: See figure 1.

Ⓐ 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, one internal-tooth lock washer in accordance with the appendix of MIL-S-83731, one locking ring, and one silicone rubber panel seal (see figure 1).

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 1 pound.

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

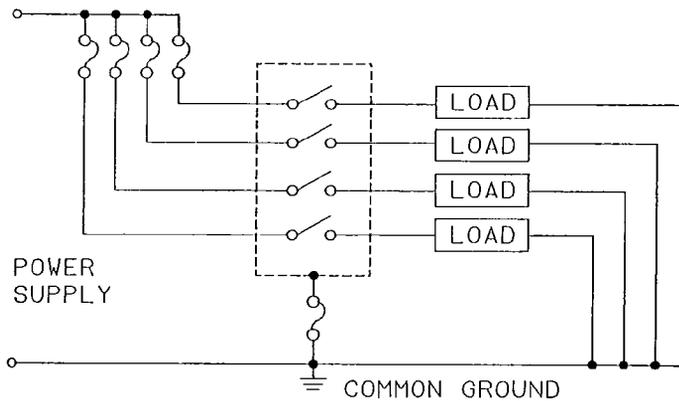


FIGURE 2. Test circuit.

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	
Resistive	5	5	5	0.010 ampere
Inductive	2	2	2	---
Lamp	1	1	1	---

MIL-S-83731/21A(USAF)

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

Logic level load: 10,000 cycles, tested in accordance with ANSI/EIA RS-448, method 17. Rate of actuation in accordance with MIL-S-93731 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.

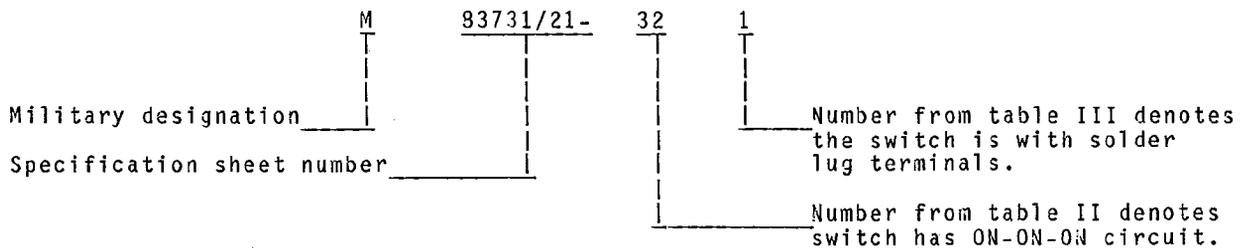
Intermediate current: Not applicable.

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 resistances. Place switches, terminals down, into shallow pan. Pour flux at 80°F ±5°F, type RMA of MIL-F-14256, specific gravity 0.896, into pan without splashing until level of flux is approximately 1/16 inch above bottom of the plastic switch case and let switches soak for 10 minutes. Remove switches from flux, clean with flux cleaning solvent, and immediately place into oven for drying at 175°F ±10°F for 2 hours. After switches have cooled to room temperature, repeat initial measurements. Contact resistance shall not increase by more than 10 mΩ over the initial reading. Disassemble the switch 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 M83731/21 followed 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 number	Circuit with toggle		
	<u>1/</u> Toward flat (down position)	Center	Opposite flat (up position)
21	1-2 ON 7-8 4-5 10-11	OFF	2-3 ON 8-9 5-6 11-12
23	1-2 ON 7-8 4-5 10-11	NONE	2-3 ON 8-9 5-6 11-12
26	1-2 MOM-ON 7-8 4-5 10-11	NONE	2-3 ON 8-9 5-6 11-12
27	1-2 MOM-ON 7-8 4-5 10-11	OFF	2-3 MOM-ON 8-9 5-6 11-12
31	1-2 MOM-ON 7-8 4-5 10-11	OFF	2-3 ON 8-9 5-6 11-12
32	1-2 ON 7-8 4-5 10-11	2-3 ON 8-9 4-5 10-11	2-3 ON 8-9 5-6 11-12
33	1-2 MOM-ON 7-8 4-5 10-11	2-3 ON 8-9 4-5 10-11	2-3 ON 8-9 5-6 11-12
34	1-2 MOM-ON 7-8 4-5 10-11	2-3 ON 8-9 4-5 10-11	NONE
35	1-2 MOM-ON 7-8 4-5 10-11	2-3 ON 8-9 4-5 10-11	2-3 MOM-ON 8-9 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

Review activities:  
Air Force - 11, 99  
DLA - ES

Preparing activity:  
Air Force - 85

Agent:  
DLA - ES

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