

PRODUCT SPECIFICATION

1. SCOPE

1.1. Content

This specification covers the performance requirements for the AMP* standard keyboard switch assembly. These switch assemblies are designed to be mounted on printed circuit boards for use in devices where momentary switching is needed.

1.2. Qualification

When tests are performed on the subject product line, the procedures specified in AMP 109 series specifications shall be used. All inspections shall be performed using the applicable QIP and product drawing.

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. AMP Specifications

- A. 109-1: General Requirements for Test Specifications
- B. 109 Series: Test Specifications as indicated in Figure 1.
(Comply with MIL-STD-202, MIL-STD-1344 and EIA RS-364)
- C. 114-2014: Switch, Keyboard, Application of

3. REQUIREMENTS

3.1. Design and Construction

Switch assemblies shall be of the design, construction, and physical dimensions specified on the applicable product drawing.

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				DR C. E. Fritz 3-6-78	AMP AMP INCORPORATED Harrisburg, Pa. 17105		
				CHK J. Swartz 3-6-78			
				APP C. Atherton 3-6-78	LOC B	NO 108-2010	REV G
				TITLE			
	G	Revise per ECN A-6090 & AF0466	<i>AK</i>	10/17 86	SHEET 1 OF 6	SWITCH ASSEMBLY, KEYBOARD, STANDARD	
	LTR	REVISION RECORD	APP	DATE			

3.2. Materials

- A. Leaf Spring, PN 62312, 62353, 62477, 62815 and 520067:
302 stainless steel, temper D, .003 thick, tin plated mounting legs.
- B. Feed-thru-button, PN 62313, 62380, 62476, 62911 and 520066: Nickel silver, temper 2, .006 thick and C 72500, temper 2, .006 thick.

3.3. Performance and Test Description

Switch assemblies shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1.

3.4. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure						
Examination of Product	Meets requirement of product drawing and AMP Spec 114-2014.	Visual, dimensional, and functional per QIP.						
ELECTRICAL								
Contact Resistance, Static Closure	<table border="0" style="width: 100%;"> <tr> <td style="text-align: center;">Measurement <u>Time</u></td> <td style="text-align: center;">Resistance, ohms max</td> </tr> <tr> <td style="text-align: center;">Before Life</td> <td style="text-align: center;">1.0 unplated 0.1 gold</td> </tr> <tr> <td style="text-align: center;">After Life</td> <td style="text-align: center;">3.5 unplated 1.0 gold</td> </tr> </table>	Measurement <u>Time</u>	Resistance, ohms max	Before Life	1.0 unplated 0.1 gold	After Life	3.5 unplated 1.0 gold	Mount switch rigidly in force displacing apparatus. Deflect switch along centerline using a .100 diameter button until the actuation force reaches 250 grams. Measure potential drop across switch at 10 ma and 5 vdc open circuit.
Measurement <u>Time</u>	Resistance, ohms max							
Before Life	1.0 unplated 0.1 gold							
After Life	3.5 unplated 1.0 gold							
Dielectric Withstanding Voltage	Switch shall withstand a test potential of 300 volts, 60 Hz at 85°C for 1 minute without breakdown.	Test between switch terminals and feed through button terminal; AMP Spec 109-29-1.						
Dielectric Breakdown	Switch shall withstand 1000 vrms per switch assembly.	Test between switch terminals and feed through button terminal; AMP Spec 109-29-3, except voltage shall be increased at 500 volts/second until failure.						

Figure 1 (cont)

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Test Description	Requirement	Procedure
MECHANICAL		
Vibration	No switch closure; no physical damage.	10-60-10 Hz traversed in 5 minutes at .030 total excursion; AMP Spec 109-21-1, procedure only.
Life Cycling	Contact resistance; contact bounce.	Subject switch to 1,000,000 cycles at 5 cycles/second; AMP Spec 109-2001.
Shock	Dielectric withstanding voltage; no switch closure; no physical damage.	50 G's sawtooth at 11 milliseconds maximum; AMP Spec 109-26-7, cond G.
Operating Force	Initial: 170-250 grams Final:	Mount switch in suitable force-displacement measurement apparatus (Instron); deflect switch along centerline using a .100 diameter button through .016 travel. Record maximum operating force.
Overtravel	Overtravel shall be .0005 minimum/switch; no permanent damage; key downtime; keystroke response.	Continue travel after contact until switch is fully depressed.
Key Downtime	Circuit continuity shall be established within 1.0 millisecond of application of force required to depress switch.	Mount switch in apparatus necessary to depress switch fully and apply force required to do so for 10 milliseconds; check for continuity.
Keystroke Response	Switch shall be open 100 millisecond maximum after force required to fully depress keyswitch is removed.	Using an oscilloscope and a .100 diameter switch actuator button, apply force along switch centerline necessary to fully depress switch (bottom out) release force instantaneously and measure time necessary for switch to open.

Figure 1 (cont)

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Test Description	Requirement	Procedure
Contact Bounce	1 millisecond maximum initial, 5 milliseconds maximum after life test on closure or opening. (Interpreted as full return to closure on opening or opening on closure).	Using a filtered 5 volt dc source and a 1000 ohm series resistance, monitor voltage drop across switch using an oscilloscope. Actuate switch with .100 diameter actuator button. Record worst-case reading for 10 closures and 10 openings on each sample.

ENVIRONMENTAL

Temperature Operation	No physical damage; contact resistance; dielectric withstanding voltage.	Mount switch in cycling apparatus, cycle switch at a rate of 10 Hz for 1 hour at 0°C and 1 hour at 60°C.
Thermal Shock	No physical damage; dielectric withstanding voltage.	Subject switch assembly to 25 cycles between -10° and 85°C; AMP Spec 109-22.

Figure 1 (end)

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3.5. Switch Tests and Sequences

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of Product	1	1	1	1
Contact Resistance, Static Closure			2,5	4,10
Dielectric Withstanding Voltage	2,4	3,5	3,6	
Dielectric Breakdown	5			
Vibration		2		
Life Cycling				8
Shock		4		
Operating Force				2,9
Overtravel				3
Key Downtime				6
Keystroke Response				7
Contact Bounce				5,11
Temperature Operation			4	
Thermal Shock	3			

(a) See Para 4.1.A.

(b) Numbers indicate sequence in which tests are performed.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Inspection

A. Sample Selection

Switch assemblies and mating printed circuit boards shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Each Test Group shall consist of 24 switch assemblies, prepared in accordance with AMP Specification 114-2014. Where individual readings are specified, 12 readings shall suffice for qualification.

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B. Test Sequence

Qualification inspection shall be verified by testing samples as specified in Figure 2.

- (1) Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

4.2. Quality Conformance Inspection

The applicable AMP inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

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