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EIA STANDARD

TOGGLE SWITCHES

RS-480

JULY 1981



Engineering Department

ELECTRONIC INDUSTRIES ASSOCIATION



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This Standard contains the major technical content of International Electro Technical Commission recommendation -- 131-1, Toggle Switches, 1962. It differs from IEC recommendation 131-1 in certain important respects, as given in Appendix B hereto. These differences have been called to the attention of the U.S. Committee of Experts for IEC Technical Committee 48C, Switches, and resolution of these differences will be sought in future meeting of TC48.

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TOGGLE SWITCHES

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TOGGLE SWITCHES

(From EIA Standards Proposal No. 1242, formulated under the cognizance of EIA P-5.8 Working Group on Slide, Rocker and Toggle Switches.)

INTRODUCTION

This EIA Standard was formulated for the purpose of:

- (a) Promoting interchangeability of toggle switches, and
- (b) Eliminating misunderstandings or confusion between manufactureres and buyer with respect to product performance values.

This Standard applies to toggle switches intended to be installed in control circuits or auxiliary circuits of electronic equipment or other equipment employing similar techniques. This Standard must be used in conjunction with a detail specification which defines specific values for the performance of the Standard and may add, delete or modify the requirements of the Standard. The buyer may utilize the Detail Specifications issued by EIA, or, if necessary, prepare his own detail specification which references this Standard. The EIA Detail Specifications assign a unique part number to each particular switch configuration covered by the Detail Specification. This part number is adequate to use for procurement of a standard switch. Within the context of this EIA Standard, a standard switch is considered to be a switch which is described by an EIA Detail Specification, and a non-standard switch is considered to be a switch which is not described by an EIA Detail Specification.

When a description of a non-standard switch is required, the manufacturer or buyer should prepare a detail specification which fully describes the non-standard switch. If the required non-standard switch differs from the switch types described by EIA Detail Specifications, a complete detail specification should be prepared. If the required non-standard switch is similar to the switch types described by the EIA Detail Specification, a detail specification may be prepared by referencing the part number of the standard switch and specifying the difference required from the standard switch.

1.0 SCOPE

These recommendations relate to toggle switches for use in equipment for electrical and electronic devices, including switches necessary to connect the supply mains. These switches are not intended to be used in electrical distribution systems.

Switches covered by these recommendations have a rated voltage not exceeding 600 volts and a rated current not exceeding 25 amperes (dc or rms values).

2.0 APPLICABLE DOCUMENTS

The following documents of the issue in effect form part of the standard to the extent specified.

2.1 International Electrotechnical Commission

Publication 131-1 Toggle Switches, Part I, General Requirements and Measuring Methods.

2.2 GSA Standards (Government Services Administration)

FED-STD-28 Screw Thread Standards for the Federal Government.

2.3 American National Standards (ANSI)

Z 310.1 Determining Resistance of Synthetic Polymeric Materials to Fungi.

2.4 Electronic Industries Association (EIA)

RS-186-9E METHOD 9: Solderability

RS-186-E Standard Test Methods for Passive Electronic Component Parts -
General Instructions and Index of Tests

RS-448 Standard Test Methods for Electromechanical Switches

2.5 Underwriters Laboratories

U.L. 94 Tests for Flammability of Plastic Materials.

3.0 DEFINITIONS

3.1 Toggle Switch:

A switch manually operated by moving a projecting lever through a small arc.

3.2 Position:

(A mechanical location referring to actuator position.) A setting of the lever which results in a particular circuit condition. A position may be momentary or maintained when the externally applied actuating force is removed.

3.3 Operating Force:

The externally applied force required to move the switch actuator (lever or rocker) from one position to an adjacent position.

3.4 Poles:

The number of separate circuits which can carry current at the same time.

3.5 Make Before Break:

The open contacts close before the closed contacts open when the switch actuator is moved from one position to another.

3.6 Break Before Make:

The closed contacts open before the open contacts close when the actuator is moved from one position to another.

3.7 Panel Sealed:

When properly mounted, the switch prevents the entrance of liquids through the panel mounting hole.

3.8 Environmentally Sealed:

The switch enclosure is sealed to prevent the entrance of the ambient environment into the switching mechanism.

3.9 Hermetically Sealed:

The switch enclosure is sealed to be gas tight by fusion of glass or ceramic to metal, or metal to metal.

3.10 Throw:

Any toggle position where a moving contact(s) makes contact with a stationary contact(s). A single-throw switch makes contact in only one toggle position. A double-throw switch makes contact in two toggle positions.

3.11 Clearance:

Clearance denotes the shortest distance measured in air between electrically conductive materials.

3.12 Creepage Distance:

Creepage distance denotes the shortest distance over the surface of insulation between electrically conductive materials.

3.0. DEFINITIONS (continued)

3.13 Electrical Ratings:

The electrical ratings of a switch are given for specified circuits by the combinations of voltage and current under which the switch shall operate satisfactorily under specified conditions for testing.

3.14 Rated Voltage and Rated Current:

The voltage and current which are marked on the switch shall be that at standard atmospheric conditions. The relation between these is shown in the list of electrical ratings.

3.15 Type:

Switches of one type comprise components having similar design features (exclusive of any mounting accessories, provided they have no significant effect on the test results) and falling within the manufacturer's usual range of ratings for such a design.

3.16 Type Tests:

Type tests are all the tests to be carried out on a number of specimens, with the object of determining whether this manufacturer can be considered to be able to produce components meeting the detail specification.

3.17 Type Approval¹:

Type approval is a certification by the switch manufacturer that he is able to produce in reasonable quantities components meeting the detail specification.

3.18 Acceptance Tests¹:

Acceptance tests are those tests carried out on all specimens or on a representative sample of the components of any consignment to ensure that their properties are within the limits of the specification.

3.19 Factory Tests¹:

Factory tests are those tests carried out by the manufacturer to verify that his product meets the detail specification.

¹ As these recommendations only cover type tests, these definitions are included solely for information.

4.0 DESIGN REQUIREMENTS

- 4.1 Switches shall be of the design, construction and physical dimensions specified by the detail specification sheet, including:

4.1.1 Mounting Means

4.1.2 Electrical Terminations

4.1.3 Ratings
The detail specification shall specify:

- A. Rated Voltage(s)
- B. Rated Current(s)
- C. Circuit conditions and associated voltage and current.

- 4.2 Materials shall be capable for meeting the test requirements.

4.3 Threaded Parts:

All removable threaded parts shall be in accordance with FED-STD-28. The unified series of threads shall be used wherever possible.

4.4 Insulation Materials

A. Flammability:

Switch insulating materials shall be certified as meeting 94V-2 flammability requirements of U.L. 94 or better.

B. Fungus Resistance:

Switch insulating materials shall have a rating of 0 to 1 when tested in accordance with the fungus test of ANSI-Z310.1.

4.5 Marking:

The switches shall be legible marked with the following information:

NOTE: Other markings may be applied to the switch provided they do not interfere with, obscure or confuse those markings specified below. When size, surface condition, or other design considerations will not allow full marking on the part, the markings shall be in the order of preference shown below. Any required marking which cannot be applied to the switch shall be applied to the unit package.

4.5.1 Terminal Identification

4.5.2 Manufacturer's name, trademark, or code identification number.

4.5.3 Identification

Either EIA part number, manufacturers part number, or users part number.

4.5.4 Date Code

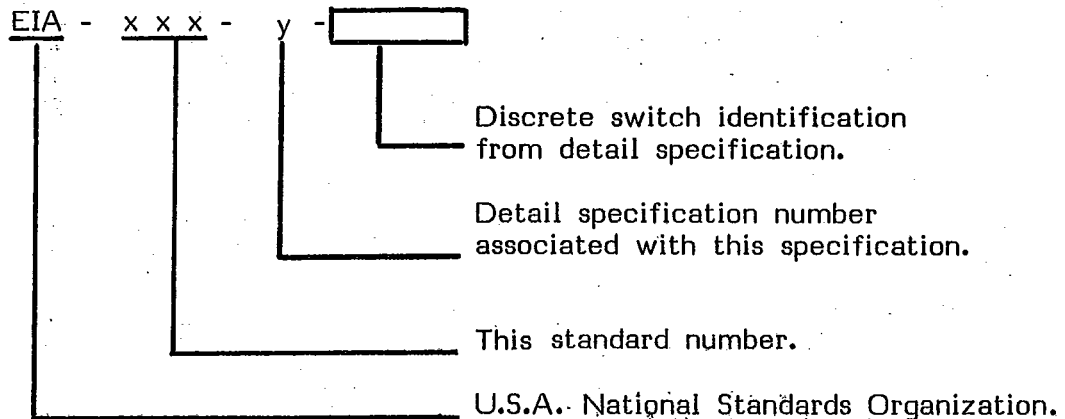
The preferred date code is a four-digit number consisting of the last two digits of the year and another two digits for the week of the year. For example, a date of 7820 denotes the switches were manufactured during the twentieth week of 1978. The manufacturer may use another date code system providing the system is described in the sources of product information published by the manufacturer.

4.5.5 Detail Specifications

The individual switch requirements shall be as specified herein and in accordance with the applicable detail specification. In the event of conflicts between this Standard and the detail specification or other complementary documents, the detail specification shall govern.

4.5.6 Part Numbering

Each switch covered by this Standard, in conjunction with a detail specification (see paragraph 3.1), shall be assigned a discrete part number consisting of the following:



4.5.7 Electrical Rating(s)

To be marked when specified.