

DETAIL SPECIFICATION
SWITCHES, ROTARY, MULTIPOLE AND SELECTOR,
GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the general requirements for closed construction rotary multipole and selector switches which are able to make, break, and carry electrical loads up to and including 10 amperes.

1.2 Classification. Switches will be classified as specified in the applicable specification sheet (see [3.1](#) and [6.5](#)).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections [3](#) and [4](#) of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections [3](#) and [4](#) of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

FEDERAL STANDARDS

- [FED-STD-H28](#) - Screw-Thread Standards for Federal Services.
- [FED-STD-595/26307](#) - Gray, Semigloss.

DEPARTMENT OF DEFENSE SPECIFICATION

- [MIL-A-8625](#) - Anodic Coatings, for Aluminum and Aluminum Alloys.
- [MIL-PRF-23827](#) - Grease, Aircraft and Instrument, Gear and Actuator Screw, NATO Code Number G-354.
- [MIL-I-24768/13](#) - Insulation, Plastic, Laminated, Thermosetting, Cotton-Fabric-Base, Phenolic-Resin (FBE).
- [MIL-I-24768/1](#) - Insulation, Plastic, Laminated, Thermosetting, Glass-Cloth, Melamine-Resin (GME).
- [MIL-DTL-83488](#) - Coating, Aluminum, High Purity.

(See [supplement 1](#) for a list of associated specification sheets.)

Comments, suggestions or questions on this document should be addressed to Defense Supply Center Columbus, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990, or emailed to switch@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

DEPARTMENT OF DEFENSE STANDARDS

- [MIL-STD-167-1](#) - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited.)
- [MIL-STD-202](#) - Test Method Standard Electronic and Electrical Component Parts.
- [MIL-STD-810](#) - Environmental Engineering Considerations and Laboratory Test
- [MIL-STD-889](#) - Dissimilar Metals
- [MIL-STD-1285](#) - Marking of Electrical and Electronic Parts.

DEPARTMENT OF DEFENSE HANDBOOKS

- [MIL-HDBK-454](#) - General Guidelines for Electronic Equipment.

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or www.assist.daps.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- [ISO 10012-1](#) - Quality Assurance Requirements for Measuring Equipment - Part 1: Metrological Confirmation System for Measuring Equipment.

(Copies of these documents are available online at <http://dod.nssn.org/search.html> or from the American National Standards Institute (ANSI), 11 West 42nd Street, New York, NY 10036-8002, telephone 212-642-4900, fax 212-302-1286.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS INTERNATIONAL (ASTM)

- [ASTM B139/B139M](#) - Phosphor Bronze Rod, Bar, and Shapes.
- [ASTM B152/B152M](#) - Copper Sheet, Strip, Plate, and Rolled Bar.
- [ASTM B633](#) - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel (DoD adopted).
- [ASTM B700](#) - Electrodeposited Coatings of Silver for Engineering Use.
- [ASTM D3955](#) - Standard Specification for Electrical Insulating Varnishes
- [ASTM D5948](#) - Molding, Compounds, Thermosetting.

(Copies of these documents are available online at www.astm.org or from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania, 19428-2959.)

SOCIETY OF AMERICAN ENGINEERS (SAE)

- [SAE AMS-QQ-N-290](#) - Nickel Plating (Electrodeposited).

(Copies of these documents are available online at www.sae.org or from Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, Pennsylvania, 15096-0001)

2.4 Order of precedence. Unless otherwise note herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between requirements of this specification and the specification sheet, the latter shall govern.

3.2 Qualification. Switches furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable qualified products lists at the time of award of contract (see [4.5](#) and [6.3](#)).

3.3 Switch types. Switches furnished under this specification shall be as defined in [3.3.1](#) and [3.3.2](#).

3.3.1 Switches covered by specification sheet and identified by type designation. Switches which are completely defined by a military specification sheet (see [3.1](#)), and switches differing from the specification sheet only in the number of sections and having a number of sections within the minimum and maximum number shown on the specification sheet, shall be as specified in [6.2](#).

3.3.2 Switch types not shown on a specification sheet. Where the applicable specification sheet does not show a specific switch type (see [3.3.1](#)), the individual part requirements shall be as specified (see [6.2](#)). The switches shall be a product of the basic style, design, and construction as the switches shown on the specification sheets and shall be acquired from a source listed on the qualified products list for the same specification sheet (see [3.2](#)). Unless otherwise specified (see [6.2](#)), the individual switch shall comply with the inspection requirements shown in [4.6](#).

3.4 Material. Material shall be as specified herein. When a definite material is not specified, a material shall be used which will enable the switches to meet the performance requirements of this specification (see [6.2](#)). Acceptance of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.4.1 Metals. Metals shall be of sea water corrosion-resistant alloys or shall be plated with IVD aluminum with chromate treatment, type II, class 3 (plate thickness .0003 inch (.008 mm)) in accordance with [MIL-DTL-83488](#) immersion zinc flake/chromate dispersion, zinc plated in accordance with class 2, type II of [ASTM B 633](#); nickel plated in accordance with class 1, grade G of [SAE-AMS-QQ-N-290](#) or anodized in accordance with [MIL-A-8625](#) (aluminum alloys only), to resist corrosion. Aluminum shall not be used for structural parts and operating shaft.

3.4.1.1 Contact material and plating. Unless otherwise specified (see [3.1](#) and [6.2](#)), the movable (rotor) switch blade contact shall be composition A phosphor bronze in accordance with [ASTM B139/B139M](#). The stationary (stator) contacts shall be copper in accordance with [ASTM B152/B152M](#). Threaded holes shall have a minimum of three full threads. The electrical contact surfaces shall be silver plated in accordance with [ASTM B700](#). The movable contact surface shall have an inlay or overlay of a minimum .002 inch (.05 mm) of fine silver or silver alloy. The stationary electrical contact surface shall have a minimum thickness of .0001 inch (.003 mm).

3.4.1.2 Current-carrying parts. Ferrous material or aluminum shall not be used for current-carrying parts, including terminal hardware.

3.4.1.3 Dissimilar metals. When dissimilar metals are used in intimate contact with each other, protection against electrolysis and corrosion shall be provided. The use of dissimilar metals in contact, which tend toward active electrolytic corrosion (particularly copper alloys, copper, or steel used in contact with aluminum or aluminum alloy) is not acceptable. However, metal plating or metal spraying of dissimilar base metals to provide similar or suitable abutting surfaces is permitted. (The use of dissimilar metals separated by a suitable insulating material is also permitted.) Dissimilar metals are defined in [MIL-STD-889](#).

3.4.1.4 Lubrication.

3.4.1.4.1 Detent mechanism. The detent mechanism and other mechanical moving parts shall be lubricated with a compound in accordance with [MIL-PRF-23827](#).

3.4.1.4.2 Contacts. Contacts shall be lubricated with a compound in accordance with [MIL-PRF-23827](#), or equal. The method for lubricating with contacts shall result in the application of a minute amount of lubrication on the contacts.

3.4.1.5 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of switch components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see [6.4.8](#))

3.4.2 Insulation.

3.4.2.1 Plastic laminates. Unless otherwise specified (see [3.1](#) and [6.2](#)), plastic laminates shall be in accordance with [MIL-I-24768/13](#), type FBE, or [MIL-I-24768/1](#), type GME.

3.4.2.2 Plastic molding. Unless otherwise specified (see [3.1](#) and [6.2](#)), plastic molding material shall be type MAI-30 or MAI-60 of [ASTM D5948](#). Color shall be gray, approximating color chip of [FED-STD-595/26307](#).

3.4.2.3 Fungus resistance. Switches shall withstand 90 days of exposure to fungus with no degradation in performance (see [4.8.16](#)).

3.4.2.4 Flammable material. Insulation material shall be fire retardant.

3.4.3 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification.

3.5 Interface and physical dimension requirements. Switches shall be of closed construction so that the switching mechanism and the switching contacts are fully enclosed (except terminals), to prevent foreign matter from entering the switch mechanism or interfering with the contacts. Switches shall be constructed to ensure proper operation when mounted in any position. The switches shall be of the design, construction, and physical dimensions specified (see [3.1](#)) and the switch circuit configuration shall conform to the applicable rotor designation specified (see [3.1](#) and [6.2](#)).

3.5.1 Threaded parts. Unless otherwise specified (see [3.1](#) and [6.2](#)), threaded parts shall be in accordance with [FED-STD-H28](#). Wherever possible, unified screw threads shall be used. Where a special diameter-pitch combination is required, the thread shall be of American National Form and of any pitch which is used in the fine-thread series.

3.5.1.1 Engagement of threaded parts. Threaded parts shall engage at least three full threads in soft metals like aluminum and its alloys. A minimum of two full threads shall be used in harder materials such as brass or steel. When a screw mates with a plastic part, a threaded metal insert shall be contained herein.

3.5.1.2 Locking of screw-thread assemblies. Unless otherwise specified (see [3.1](#)), all screw-thread assemblies shall be rendered resistant to loosening under vibration. Unless otherwise specified (see [3.1](#)), bronze, stainless steel, or suitably plated steel split type, or internal-tooth lockwashers shall be provided under all nuts or screw heads. The use of locknuts is permitted in lieu of lockwashers.

3.5.1.3 Hardware.

3.5.1.3.1 Mounting hardware. The mounting hardware shall be as specified (see [3.1](#)). Unless otherwise specified (see [6.2](#)), mounting hardware shall be assembled in the proper order as shown on the applicable specification sheet for direct Government acquisition or supplied un-assembled along with terminal hardware as specified (see [3.5.1.3.2](#)).

3.5.1.3.2 Terminal hardware. The terminal hardware shall be as specified (see [3.1](#) and [6.2](#)). If the terminal hardware is not assembled to the switch, it shall be placed in a bag and firmly secured to the switch.

3.5.1.3.3 Knobs. Unless otherwise specified (see [6.2](#)), switches shall be provided with knobs as specified (see [3.1](#)).

3.5.2 Stops. Switches shall be provided with adjustable stops as required (see [3.1](#)) to limit switch positions. Unless otherwise specified (see [6.2](#)), screws and lockwashers required as parts of adjustable stops shall be placed in sturdy bags firmly attached to the switches.

3.5.3 Operating shaft. The shaft shall be steel and shall be insulated from all current-carrying members. The configuration and dimensions shall be as specified (see [3.1](#)).

3.5.3.1 Perpendicularity of operating shaft (applicable to JR, JM, RJR, and RJRA switches). For JR and JM switches with 15 decks or more, the plane generated by the mounting surfaces of the mounting pads shall be perpendicular to the operating shaft within 1 degree. For RJR and RJRA switches, the mounting surface shall be perpendicular to the centerline of the operating shaft, at the lock arm, within .055 inch (1.40 mm).

3.5.3.2 Rotational float of shaft. For types RJR and RJRA switches, the rotational float of the operating shaft shall not exceed 3 degrees in the detent position before and after the endurance tests. For all other switches, the rotational float of the operating shaft shall not exceed 6 degrees in the detent position before and after the endurance test.

3.5.4 Terminals. The terminals shall be as specified (see [3.1](#) and [6.2](#)).

3.5.4.1 Alignment (applicable to RJR and RJRA switches). For RJR and RJRA switches, the centerlines of the contact terminals in successive sections shall be in line with the centerline of the corresponding contact terminal in the first section within .020 inch (.51 mm).

3.5.5 Indexing. Switches shall have a positive detent or indexing mechanism, locating each contact position, except when spring return action is specified (see [3.1](#)). The positive detent or indexing mechanism shall be designed to minimize the possibility of the movable element or elements coming to rest between positions. Switches with spring return mechanism shall return from the full travel momentary position to the specified fixed position within ± 5 degrees, including the movable elements, when the operating force is removed. Glass or other fragile materials shall not be used in detent or indexing mechanisms.

3.5.6 Contact mating. The movable switch blade contacts shall provide a firm wiping action and shall engage both sides of the stationary contacts at the contact engagement areas with a uniform positive pressure.

3.5.7 Barriers. Unless otherwise specified (see [3.1](#)), barriers shall be provided between current carrying terminals of adjacent decks and shall be of the diameter specified (see [3.1](#)). Barrier material shall be FBE laminate in accordance with [MIL-I-24768/13](#) or GME in accordance with [MIL-I-24768/1](#). The barrier surface and edge finish shall be smooth and non-abrasive. Varnish in accordance with [ASTM D3955](#) shall be applied after any required marking has been applied to plastic laminate barriers.

3.6 Circuit configuration. Switches shall make and break the specified circuits in all positions of all sections (see 4.8.2). The making and breaking of circuits, in both momentary and detented positions, shall be positive. In switching break-before-make contact arrangement, the first contact fully breaks before the second contact is made. In switching make-before-break contact, the second contact is closed before the first is open.

3.7 Strength of mounting bushing (bushing mounted switches only). There shall be no damage to the switch, nonturn device, or loosening or twisting of the bushing relative to the switch front plate assembly (see [4.8.3](#)).

3.8 Torque.

3.8.1 Rotational. The torque required to rotate the shaft from each detent position to the next shall be as specified (see [3.1](#) and [4.8.4](#)). When applicable, the torque required to rotate the shaft into each momentary position shall be as specified (see [3.1](#) and [6.2](#)).

3.8.2 Stops (applicable only to switches with stops). There shall be no broken, loose, deformed, or displaced parts, nor shall the contacts transfer from their proper condition (see [4.8.4.2](#)).

3.9 Terminal strength. The switch shall be able to operate mechanically and electrically (see [4.8.5](#)). There shall be no short circuitry, breakage, or damage to the switch.

3.10 Dielectric withstanding voltage. Switches shall withstand the application of the specified voltages without arcing, breakdown of insulation, or damage, and there shall be no leakage current greater than 100 microamperes (see [4.8.6](#)).

3.11 Insulation resistance. The insulation resistance shall be greater than 200 megohms (see [4.8.7](#)).

3.12 Contact resistance. The contact resistance shall not exceed 10 milliohms (see [4.8.8](#)).

3.13 Endurance. Switches shall be electrically and mechanically operative during and after the tests specified in [4.8.9.1](#) and [4.8.9.2](#), and the contact resistance shall not exceed 10 milliohms. Each mating contact shall make and break at the proper time throughout the test. After the test, there shall be no evidence of broken, loose, deformed, or displaced parts.

3.14 Temperature rise. The temperature rise (see [4.8.10](#)) shall be within the limits specified (see [3.1](#) and [6.2](#)).

3.15 Vibration. There shall be no opening of closed contacts in excess of 10 microseconds (see [4.8.11](#)) and there shall be no change in shaft position, or evidence of broken, loose, deformed, or displaced parts.

3.16 High-impact shock. Mating closed contacts shall not open for a period of time longer than 20 milliseconds and there shall be no change in shaft position, or evidence of broken, loose, deformed, or displaced parts (see [4.8.12](#)).

3.17 Moisture resistance. The insulation resistance, immediately after conclusion of the test specified in [4.8.13](#) and while the switches are still in the humidity chamber, shall be greater than 100 megohms. At the end of the drying period, the insulation resistance shall be greater than 100 megohms. At the conclusion of the test there shall be no evidence of corrosion, breaking, cracking, spalling, or loosening of hardware, and the mounting and terminal hardware shall be readily removable.

3.18 Salt atmosphere (corrosion). There shall be no evidence of excessive corrosion (see [4.8.14](#)). Excessive corrosion is defined as corrosion which interferes with the electrical or mechanical performance, or, in the case of plated metals, corrosion which has passed through the plating and exposed the base metal. After the test, mounting and terminal hardware shall be readily removable.

3.19 Seal (applicable to style JF switches only). There shall be no evidence of leakage along the shaft or around the bushing (see [4.8.15](#)).

3.20 Marking.

3.20.1 Identification of product. Switches shall be marked in accordance with [MIL-STD-1285](#) with the information specified in [3.20.1.1](#) and [3.20.1.2](#).

3.20.1.1 Switches covered by specification sheets:

- a. Type designation.
- b. Military Part or Identifying Number (PIN) (when applicable).
- c. Manufacturer's name or symbol.
- d. Electrical rating.
- e. Date code.
- f. Terminal and stop identification (see [3.1](#), [3.20.2](#), and [3.20.3](#)).

3.20.1.2 Switches not covered by specification sheets:

- a. Manufacturer's PIN.
- b. Manufacturer's name or trademark or Contractors and Government Entity (CAGE) code for manufacturers.
- c. Terminal and stop identification (see [3.1](#), [3.20.2](#), and [3.20.3](#)).
- d. Electrical rating.
- e. Date code.

3.20.2 Terminal identification. Unless otherwise specified (see [3.1](#)), switch terminals shall be marked with letters, whose sequence is counter-clockwise when viewed from rear end of the switch. The terminal marking shall be on both sides of the barrier. The marking shall be in a contrasting color that allows for ease of identification in all lighting conditions. The markings shall be a minimum of .125 inch (3.18 mm) in height.

3.20.3 Stop identification. Unless otherwise specified (see [3.1](#)), switch stop positions shall be marked with numbers, whose sequence is clockwise when viewed from the rear end of the switch. The marking shall have a minimum height of .06 inch (1.5 mm) and be stamped or engraved into the plate containing the stop-screw holes.

3.21 Workmanship. Switches shall be processed in such a manner as to be uniform in quality and shall be free from cracked or displaced parts and other defects that will affect life, serviceability, or appearance. Molded or laminated parts shall be free of chips, blemishes, or flakes which are detrimental to the operating functions of the switch. Gate marks or flow lines shall not be considered a defect.

4. VERIFICATION

4.1 Classification of inspection. The inspection requirements specified herein are classified as follows:

- a. Materials inspection (see [4.3](#)).
- b. Qualification inspection (see [4.5](#)).
- c. Conformance inspection (see [4.7](#)).

4.2 Test equipment and inspection facilities. The manufacturer shall establish and maintain a calibration system in accordance with [ISO 10012-1](#), or equivalent system as approved by the qualifying activity.

4.3 Materials inspection. Materials inspection shall ensure that the materials listed in [table I](#), used in fabricating the switches, are in accordance with the applicable referenced specifications or requirements prior to such fabrication. Failure to comply with the above requirements shall constitute rejection of all affected lots.

4.4 Inspection conditions. Unless otherwise specified herein, inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" section of [MIL-STD-202](#).

4.5 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government (see [6.3](#)) on sample units produced with equipment and procedures normally used in production.

4.5.1 Samples for qualification. Six sample switches for qualification shall be selected in accordance with the detail specification sheet (see [3.1](#)). The test to be performed and the test sequence shall be in accordance with [table II](#) and [table III](#).

4.5.2 Retention of qualification. Every 12 months, the manufacturer shall provide verification of qualification to the qualifying activity. In addition, the manufacturer shall immediately notify the qualifying activity whenever the group B inspection results indicate failures of the qualified product to meet the requirements of this specification. Verification shall be based on meeting the following requirements:

- a. Design of switch has not been modified (every 12 months).
- b. Verification of group A lot acceptance (every 12 months) (see [4.7.1.2](#)).
- c. Periodic group B inspection (every 24 months) (see [4.7.1.4](#)).

At three-year intervals, a summary of results of group C test shall be forwarded. Group B and group C test reports shall be forwarded to the qualifying activity and shall include copies of original data sheets. Each summary and test report shall be validated by the Government quality assurance representative. If the test results indicate nonconformance with specification requirements, requalification will be required unless proof of corrective action for each failure is provided. Failure to submit the summaries will result in loss of qualification for that product. In addition to the periodic submission of inspection data, the suppliers shall immediately notify the qualifying activity at any time during the intervals that inspection data indicates failure of the qualified product to meet the requirements of the specification. In case there is no production during the intervals, a statement to this effect shall be forwarded to the qualifying activity.

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TABLE I. Materials inspection.

Material	Requirement	Applicable document
Metal plating or treatment	3.4.1	MIL-DTL-83488 , ASTM B633 , SAE-AMS-QQ-N-290 , or MIL-A-8625
Contact surface	3.4.1.1	ASTM B700
Lubrication	3.4.1.4	MIL-PRF-23827
Insulation: Plastic	3.4.2.1 and 3.4.2.2	ASTM D5948 , MIL-I-24768/13 , or MIL-I-24768/1
Fungus resistance	3.4.2.3	4.8.16
Flammable material	3.4.2.4	MIL-HDBK-454
Metals:		
Bronze	3.4.1.1	ASTM B139/B139M
Copper	3.4.1.1	ASTM B152/B152

TABLE II. Qualification inspection.

Inspection	Requirement	Test Method	Sample number 1/ 2/					
			1	2	3	4	5	6
Visual and mechanical examination	3.3 , 3.4 - 3.5.7 incl. 3.20 and 3.21	4.8.1	1	1	1	1	1	1
Circuit configuration	3.6	4.8.2	2	2	2	2	2	2
Torque	3.8	4.8.4	3	3	3	3	3	3
Terminal strength	3.9	4.8.5	4	4	4	4		
Dielectric withstanding voltage	3.10	4.8.6	5	5	5	5	4	4
Temperature rise	3.14	4.8.10	6	6				
Endurance	3.13	4.8.9	7	7				
Temperature rise	3.14	4.8.10	8	8				
Vibration	3.15	4.8.11			6	6		
High-impact shock	3.16	4.8.12			7	7		
Strength of mounting bushing	3.7	4.8.3			8	8	5	5
Moisture resistance	3.17	4.8.13					6	
Salt atmosphere (corrosion)	3.18	4.8.14						6
Seal (style JF)	3.19	4.8.15	9	9	9	9	7	7
Fungus Resistance	3.4.2.3	4.8.16	10	10	10	10	8	8
Dielectric withstanding voltage	3.10	4.8.6	11	11	11	11	9	9
Insulation resistance	3.11	4.8.7	12	12	12	12	10	10
Contact resistance	3.12	4.8.8	13	13	13	13	11	11
Torque	3.8	4.8.4	14	14	14	14	12	12
Circuit configuration	3.6	4.8.2	15	15	15	15	13	13
Visual and mechanical examination	3.3 , 3.4 - 3.5.7 incl. 3.20 and 3.21	4.8.1	16	16	16	16	14	14

1/ Sample units shall include at least one switch of each rotor contact configuration.

2/ Samples 3 and 4 shall have the greatest number of sections listed in the applicable specification sheet.

TABLE III. Extended approval.

Column I Approved type	Column II Approval extended to type	Column III Except for test numbers 1/ 2/
Style JF	Style JFM	5 and 6
Style JR	Style RJR and style RJRA	
Style JR	Style JR300	
Style JR	Style JRM300	
Style JR		

1/ Sample to be tested in accordance with [table II](#).

2/ Moisture resistance and Salt atmosphere tests shall not be required.

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4.6 Qualification inspection requirements for switches not covered by specification sheets. Qualification inspection requirements for switches not covered by [3.3.1](#) shall be performed by the supplier after award of contract and prior to full-scale production. Unless otherwise specified (see [6.2](#)), inspection shall be as specified in [4.5](#).

4.6.1 Samples. Unless otherwise specified (see [6.2](#)), the samples and test routine shall be as specified in [4.5.1](#) and [table II](#). This acceptance is valid only on the contract under which it is granted unless extended by the Government to another contract. Samples subjected to this inspection shall not be delivered on the contract or order.

4.6.2 Failures. One or more failures shall be cause for refusal to grant inspection acceptance.

4.7 Conformance inspection.

4.7.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A, B, and C inspection.

4.7.1.1 Inspection lot. An inspection lot shall consist of switches of the same basic design, produced under essentially the same conditions, and offered for inspection at one time.

4.7.1.2 Group A inspection. Sample switches shall be selected from each lot in accordance with [table IV](#). Examinations and tests shall be conducted in the order listed.

TABLE IV. Group A inspection.

Examination or test	Requirement	Examination and test method
Circuit configuration	3.6	4.8.2
Visual and mechanical examination	3.1 , 3.4 to 3.5.7 incl. 3.20 and 3.21	4.8.1
Dielectric withstanding voltage	3.10	4.8.6

4.7.1.3 Sampling plan. As a minimum, the contractor shall inspect a sample quantity of switches in accordance with the sampling plan defined herein. Sample size depends on classification of the characteristic as shown in [table V](#). If one or more defects is found in any sample, the entire lot shall be rejected and screened 100 percent by the contractor for the defect found.

TABLE V. Sampling plan.

Lot size	Critical characteristic
2 to 8	All
9 to 15	All
16 to 25	All
26 to 50	All
51 to 90	All
91 to 150	125
151 to 280	125
281 to 500	125
501 to 1,200	125
1,201 to 3,200	125
3,201 to 10,000	192
10,001 to 35,000	294
35,001 to 150,000	294

4.7.1.4 Group B inspection. Two switches of each contact configuration produced during each 12-month period following qualification shall be selected from the lot and subjected to the examination and tests specified in [table VI](#) in the order listed. If a specification sheet covers both positive detent and momentary action mechanisms, one sample shall be positive detent and one sample shall be momentary action. Samples selected shall have passed the group A inspection specified in [4.7.1.2](#). No samples are required for testing during the year that the group C tests are completed and submitted. Sample switches which have been subjected to group B inspection shall not be offered for delivery.

TABLE VI. Group B inspection.

Examination or test	Requirement	Examination and test method
Visual and mechanical examination	3.1 , 3.4 to 3.5.7 incl., 3.20 and 3.21	4.8.1
Circuit configuration	3.6	4.8.2
Torque	3.8	4.8.4
Endurance	3.13	4.8.9
Temperature rise	3.14	4.8.10
Contact resistance	3.12	4.8.8
Seal (style JF only)	3.19	4.8.15
Dielectric withstanding voltage	3.10	4.8.6
Insulation resistance	3.11	4.8.7
Torque	3.8	4.8.4
Circuit configuration	3.6	4.8.2
Visual and mechanical examination	3.1 , 3.4 to 3.5.7 incl., 3.20 and 3.21	4.8.1

4.7.2 Qualification verification inspection. Qualification verification inspection shall consist of group C inspection. Except where the results of these inspections show noncompliance with the applicable requirements (see [4.7.2.2](#)), delivery of products which have passed groups A and B shall not be delayed pending the results of these qualification verification inspections.

4.7.2.1 Group C inspection. The number of sample switches shall be as specified in [4.5.1](#) and shall be submitted 36 months after the date of notification of qualification, and after each subsequent 36-month period, when production of a particular type of switch has been suspended for 24 months, sample switches shall be selected from the first lot of the new production following this period. The sample switches shall be subjected to the examination and tests specified in [table II](#) in the order listed. Samples selected shall have passed the group A inspection specified in [4.7.1.2](#) and shall be taken from production which occurred during the last year of the reporting period. Sample switches which have been subjected to group C inspection shall not be offered for delivery.

4.7.2.1.1 Group C suspension. At the request of the manufacturer, group C testing may be suspended with the qualifying activity's approval. If the design, material, construction, or processing is changed or if there are any quality problems or failures, the qualifying activity may require resumption of the original testing requirements. Regardless of reduction of tests, the manufacturer shall supply product capable of passing the prescribed tests.

4.7.2.2 Noncompliance. If a sample fails to pass group B or group C inspection, the supplier shall take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials and processes and which are considered subject to the same failure. Acceptance of the product shall be discontinued until corrective action, acceptable to the Government, has been taken. After the corrective action has been taken, group B or group C inspection shall be repeated on additional sample units (all inspection, or the inspection which the original sampled failed, at the option of the Government). Group A inspection may be reinstated; however, final acceptance shall be withheld until the group B or group C reinspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and the corrective action taken shall be furnished to the cognizant inspection activity and the qualifying activity.

4.8 Examination and tests. Examination and tests shall be as specified in [4.8.1](#) through [4.8.15](#) (see [6.3](#)).

4.8.1 Visual and mechanical examination. Switches shall be examined to verify that the design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements (see [3.1](#), [3.4](#) through [3.5.7](#), [3.20](#), and [3.21](#)).

4.8.2 Circuit configuration (see [3.6](#)). Switches shall be tested to determine conformance to the actual open and closed switch circuit conditions including shorting and nonshorting functions to the applicable diagram (see [3.1](#) and [6.2](#)). Each contact of each deck shall be tested. Suitable circuitry shall be used. Switches with adjustable stops shall be adjusted to give the maximum number of switching positions possible.

4.8.3 Strength of mounting bushing (see [3.7](#)). Bushing mounted switches shall be mounted on a metal panel using normal mounting means and hardware. A torque of 50 inch-pounds shall be applied to the mounting nut on switches with .469 inch (11.91 mm) diameter bushings or larger and a torque of 25 inch-pounds shall be applied to the mounting nut on smaller size bushings. The mounted switch body shall additionally be subjected to a torque of 5 inch-pounds with the nonturn device mounted on the switch in the normal manner.

4.8.4 Torque (see [3.8](#)). Switches shall be mounted by their normal mounting means.

4.8.4.1 Rotational. The torque required to rotate the switch shaft with respect to the switch body shall be measured by a torque wrench or other torque measuring device. The switch shaft shall be rotated from each maintained position to the adjacent positions in both directions.

4.8.4.2 Stops (applicable only to switches with stops). Unless otherwise specified (see [3.1](#)), a torque of 100 inch-pounds shall be gradually applied to the shaft with the shaft in an extreme rotational position. Mating switch section contacts shall be monitored for opening or closing of contacts as required in the stop position.

4.8.5 Terminal strength (see [3.9](#)). The number of terminals tested shall equal the number of terminals in one deck and they shall be selected to include one terminal in each position and, where possible, not more than one terminal in each deck. If the number of positions exceeds the number of decks, additional terminals in each deck shall be tested to cover all positions.

4.8.5.1 Pull. Unless otherwise specified (see [3.1](#)), a force of 5 pounds shall be applied to the terminals at the normal location for attaching lead wires. The pull shall be gradually applied and maintained for 10 seconds in each of the following mutually perpendicular directions:

- a. Tangent to the deck.
- b. Parallel to the switch axis.
- c. Perpendicular to both the switch axis and the tangent to the deck.

4.8.5.2 Torque. Terminals of the switches shall be tested in accordance with [method 211, test condition E, of MIL-STD-202](#), and shall be subjected to a torque of 7.5 inch-pounds, and shall be maintained for 10 seconds. This test shall be made on terminals previously subjected to the pull test. The torque shall be applied 10 times in each direction.

4.8.6 Dielectric withstanding voltage (see [3.10](#)). Switches shall be tested in accordance with [method 301 of MIL-STD-202](#). The following details shall apply:

- a. The test voltage shall be 1,200 volts root mean square (rms), 60 hertz (Hz) except that following the endurance tests, the test voltage shall be 600 volt rms, 60 Hz.
- b. Nature of potential: Alternating current (ac).
- c. For group A inspection, the test voltage shall be applied for 5 seconds. For qualification and group B and group C inspection, the test voltage shall be applied for 1 minute.
- d. In each switch position, the test voltage shall be applied between open circuit contacts, and between closed contacts and noncurrent carrying parts.

4.8.7 Insulation resistance (see [3.11](#)). Switches shall be tested in accordance with [method 302 of MIL-STD-202](#). The following details shall apply:

- a. Test condition: B.
- b. Points of measurements: In each switch position, the test voltage shall be applied between open circuit contacts, and between closed contacts and noncurrent carrying parts.
- c. For group B inspections, the test voltage shall be applied for 15 seconds. For qualification and group C inspection, the test voltage shall be applied for 1 minute.

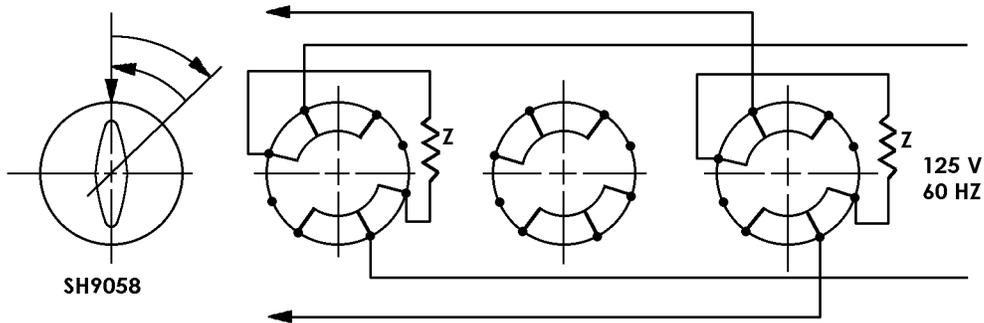
4.8.8 Contact resistance (see [3.12](#)). Switches shall be tested in accordance with [method 307 of MIL-STD-202](#). The following details and exceptions shall apply:

- a. Method of connection: Test leads shall be connected by a method suitable for the switch terminals.
- b. Test current: Rated current, except after mechanical endurance: 100 milliamperes (mA).
- c. Maximum open-circuit voltage: Related voltage, except after mechanical endurance: 4 volts.
- d. Number of activations prior to measurement: 1.
- e. Number of measurements: Five separate measurements shall be taken and the average value calculated.

4.8.9 Endurance (see [3.13](#)). Electrical and mechanical endurance tests shall be performed in the order as shown in [4.8.9.1](#) and [4.8.9.2](#). The contact resistance of each pole subjected to the electrical endurance test, and one pole in each deck not subjected to the endurance test, shall be determined as specified in [4.8.8](#) at the following times:

- a. Before electrical endurance.
- b. After every 4,000 operations during electrical endurance.
- c. After electrical endurance.
- d. After mechanical endurance.

4.8.9.1 Electrical. Each deck or a maximum of five switching circuits in the switch shall make and break the rated load. Three decks shall be distributed uniformly over the entire length of the switch. Switching shall be double-pole break as shown on [figure 1](#). The switch shall be subjected to 40,000 cycles of operation. A cycle of operation is defined as the movement of the switch shaft from an open circuit position to an adjacent closed circuit position and return to the open circuit position. The cycling rate shall be approximately 30 cycles per minute (c/m) with equal periods of time in the open and closed positions. Switches shall be monitored to determine when any loaded contact fails to open and close in proper sequence.



Z - Rated impedance load

NOTE: Switch wiring shall be size 20 for less than 5 amperes and size 16 for 5 amperes or more. All leads from switch terminals to power supply or to load resistors shall be at least 2 feet long. Switch jumper wires shall be as short as practicable.

FIGURE 1. Typical load circuit for electrical endurance test.

4.8.9.2 Mechanical. The switch shall be operated without electrical load for 5,000 cycles of operation. A cycle of operation is defined as a complete rotation of the switch shaft through all switch positions. Where the switch has removable stops, the stops shall be removed and a cycle of operation shall be the full 360-degree rotation of the shaft. Where the switch has nonremovable stops, the rotation of the shaft from the fully counter-clockwise position to the fully clockwise position and return shall constitute 2 cycles of operation. The cycling rate shall be approximately 15 c/m.

4.8.9.3 Momentary position return. Switches having momentary positions shall be operated to and released from each momentary position five times before and after the endurance operations.

4.8.9.4 Rotor and shaft alignment (see 3.5.3). For samples selected for the endurance test, the angle between the center of the detent position and the opening of the contacts shall be measured on break before make contacts of two terminals. The terminals shall be located on adjacent switch wafers. Three measurements shall be taken for each terminal and the average angle calculated for each terminal. The method of measurement shall provide for an accuracy of 15 minutes of angle.

4.8.10 Temperature rise (see 3.14). The temperature rise of the switch stationary contact energized during the electrical endurance tests shall be determined by means of thermocouples of small wire gauge (28-32 AWG). The temperature sensitive element shall be placed on the contacts where they first emerge from the switch body. Temperature measurements shall be taken prior to and immediately following the electrical endurance test. The contacts shall be energized at rated current at any convenient voltage within the switch rating. Temperature measurements shall be taken at half-hour intervals until three successive measurements are within $\pm 1^{\circ}\text{C}$.

4.8.11 Vibration (see 3.15). Switches shall be tested in accordance with [MIL-STD-167-1](#), type I. The following details and exceptions shall apply:

- a. Test and measurements prior to vibration: Not applicable.
- b. Method of mounting: Switches shall be rigidly mounted by their normal mounting means. The mounting fixture shall be free from resonance over the test frequency range. Rear support shall be provided for style JL switches having 6 or more decks; for style JK switches having 11 or more decks; and for all other switches having 20 or more decks.
- c. Direction of motion: One of the directions of vibration shall be a plane perpendicular to the longitudinal axis of the switch.
- d. Electrical test conditions: The test circuit shall be in accordance with [method 310 of MIL-STD-202](#), and shall consist of one pair of closed mated contacts on each section. At the option of the manufacturer, contacts may be wired in series.
- e. Test measurements during vibration: As specified in [4.8.11d](#).
- f. Measurements after vibration: Not applicable.
- g. Examination after test: Switches shall be examined for change in shaft position, and evidence of broken, loose, deformed, or displaced parts.

4.8.12 High-impact shock (see 3.16). Switches shall be tested in accordance with [method 207 of MIL-STD-202](#). The following details and exceptions shall apply:

- a. Mounting: Switches shall be mounted using the fixture on figure 207-4A for standard mounting fixtures for electrical-indicating switchboard meters and other panel-mounted parts of [method 207 of MIL-STD-202](#). Rear support shall be provided for style JL switches having 6 or more decks; for style JK switches having 11 or more decks; and for all other switches having 20 or more decks.
- b. Electrical test conditions: As specified in [4.8.11d](#).
- c. Measurements during High-impact shock: Switch contacts shall be monitored for opening at each blow.
- d. Measurement after High-impact shock: Not applicable.
- e. Examination after test: Switches shall be examined for change in shaft position, and evidence of broken, loose, deformed, or displaced parts.

4.8.13 Moisture resistance (see [3.17](#)). Switches shall be tested in accordance with [method 106 of MIL-STD-202](#). The following details shall apply:

- a. Mounting: Switches shall be mounted on a corrosion-resistant metal panel with the shaft in the horizontal position.
- b. Initial measurements: Not applicable.
- c. Polarization: During steps 1 to 6 inclusive, a polarization voltage of 100 volts direct current (V dc) shall be applied between two terminals tied together on opposite sides and adjacent to a through bolt, or a terminal adjacent to a grounded metal portion if no through bolting is used and the metal panel. Polarization voltage shall also be applied to two other adjacent terminals elsewhere on the switch section. One section of each switch shall be so tested. The negative polarity shall be applied to the metal panel.
- d. Steps 7a and 7b are not applicable.
- e. Load voltage: Not applicable.
- f. Final measurements: Immediately after the conclusion of the test and while the switches are still in the humidity chamber, insulation resistance shall be measured as specified in [4.8.7](#), unless otherwise specified (see [3.1](#)). Unless otherwise specified (see [3.1](#)), at the end of the drying period, insulation resistance shall again be measured as specified in [4.8.7](#).

Within 24 hours after the test, the switches shall be examined for evidence of corrosion, breaking, cracking, spalling, or loosening of terminals. A movement of the terminal within the confines of the terminal anchoring device will be permitted provided continuity of electrical contact is not impaired. Mounting and terminal hardware shall be removable at the end of the test.

4.8.14 Salt atmosphere (corrosion) (see [3.18](#)). Switches with their mounting hardware, assembled with their mounting means, shall be tested in accordance with [method 101 of MIL-STD-202](#). The following details shall apply:

- a. Test condition: B.
- b. Measurements after exposure: Not applicable.

After the test, switches shall be examined for evidence of excessive corrosion. Mounting and terminal hardware shall be removable at the end of the test.

4.8.15 Seal (applicable to style JF switches only) (see [3.19](#)). Before conducting the test, all gaskets which can normally be replaced in service shall be disassembled from the switch and then reassembled with the switch. The switch shall then be mounted in a test enclosure by the switch's normal mounting facility and the test enclosure submerged under a 6-foot head of water, or submerged in water and subjected to external air pressure equivalent to a 6-foot head of water, for a period of 1 hour. During this test, the switch shaft shall be rotated through its normal travel limits at least five times. There shall be no evidence of leakage.

4.8.16 Fungus resistance. Switches shall be tested in accordance with [method 508.5 of MIL-STD-810](#). Subsequently, the switch shall pass the tests of [4.8.6](#) and [4.8.3](#). The following details shall apply:

Test duration: The test duration shall be 90 days

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see [6.2](#)). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use.

6.1.1 Communication and low power control equipment. The switches covered by this specification are intended for use in communication and low power control equipment where reliability and ruggedness are required.

6.1.2 DC ratings. No dc ratings are given for the switches included in this specification. The switches can be "teased" (slow movement of the rotor contacts making and breaking the stator contacts) and this "teasing" is highly destructive to contacts in switching dc loads. For 30-volt dc resistive loads, the maximum current interrupted by the switches should not exceed one-half that shown for the individual styles at 125 volts ac unless reduced switch life can be tolerated. For other dc applications, inquiries should be addressed to the command or agency concerned indicating the voltage, current, type of load, and life expectancy in terms of cycles of operation.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of the specification.
- b. If required, the specific issue of individual documents referenced (see [2.2.1](#) and [2.3](#)).
- c. Title, number, and date of the applicable specification sheet and the type designation (see [3.1](#) and [6.5](#)).
- d. For switches covered by a specifications sheet but differing in number of sections, the number of sections required (see [3.3.1](#)).
- e. For types of switches not shown on a specification sheet, applicable complementary documents such as manufacturer's drawings or data sheets showing details of variations from the specification sheet (see [3.3.2](#)).
- f. Inspection requirements, if other than as specified in [4.6](#) (see [3.3.2](#)).
- g. Materials, if other than as specified (see [3.4](#)).
- h. Contact surface, if other than as specified (see [3.4.1.1](#)).
- i. Insulation, if other than as specified (see [3.4.2.1](#) and [3.4.2.2](#)).
- j. Design and construction (see [3.5](#)).
- k. Threaded parts, if other than as specified (see [3.5.1](#)).
- l. Mounting hardware (see [3.5.1.3.1](#)).
- m. Terminal hardware (see [3.5.1.3.2](#)).
- n. Knobs (see [3.5.1.3.3](#)).
- o. Whether stops are required and their positions (see [3.5.2](#)).
- p. Operating shafts (see [3.5.3](#)).
- q. Terminals (see [3.5.4](#)).
- r. Rotational torque (see [3.8.1](#)).
- s. Temperature rise (see [3.14](#)).
- t. Whether seal is applicable (see [3.19](#)).
- u. Marking (see [3.20](#)). Samples required for qualification, if necessary (see [4.51](#)).
- v. Inspection requirements: To determine suitability of variations from qualified switch style, the acquisition document should specify:
 - (1) Tests to be performed if other than specified (see [4.6](#)).
 - (2) Data and samples to be submitted, if any (see [4.6.1](#)).
- w. Circuit configuration and diagrams to be used for specifying the circuit configuration for each switch section (see [4.8.2](#)).
- x. Terminal strength, if other than as specified (see [4.8.5](#)).
- y. Dielectric withstanding voltage: Test voltage, if other than as specified (see [4.8.6](#)).
- z. Endurance, if other than as specified (see [4.8.9.2](#)).
- aa. Packaging requirements (see [5.1](#)).

6.3 Qualification With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List QPL 21604 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from (insert name, mailing address, and email of qualifying activity). An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at <http://assist.daps.dla.mil>.

6.4 Definitions. For the purpose of this specification, the definitions listed in [6.5.1](#) through [6.5.7](#) apply.

6.4.1 Operating shaft. A journaled member which drives the rotating members of the switch.

6.4.2 Angle of throw. The number of degrees of rotation through which the shaft travels in moving from one position of the switch to the next consecutive position.

6.4.3 Shorting type switch. Also called make-before-break. When switching from one position to the next, the second contact is closed before the first is opened.

6.4.4 Nonshorting type switch. Also called break-before-make. When switching from one position to the next, the first contact fully breaks before the second contact is made.

6.4.5 Section or deck. That part of a switch complete in itself except for means of operating it, and consisting of a rotor and stator assembled as a unit with stationary and moving contacts.

6.4.6 Stator. The stationary insulating portion of the switch section.

6.4.7 Rotor. An assembly of contacts and insulating hub.

6.4.8 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to [ASTM-B545](#) (Standard Specification for Electrodeposited Coatings of Tin).

6.5 Type designation. The type designation to be used for switches acquired to this specification is created as follows (see [3.3.1](#) and [6.2](#)):

<u>S</u>	<u>2</u>	<u>JR</u>	<u>M</u>	<u>10</u>
Component (6.5.1)	Rotor (6.5.2)	Style (6.5.3)	Action (6.5.4)	Sections (6.5.5)

6.5.1 Component. The component designation for rotary switches covered by this specification will be the letter S.

6.5.2 Rotor. The rotor designation will be a single digit indicating the rotor contact configuration in accordance with figure 2. Rotor configurations 1, 2, 3, and 5 are break-before-make contact arrangements. In changing switch positions, the closed circuit opens before the open circuit closes. Configuration 4 is a combination break-before-make and make-before-break.

DESIGNATION	CONFIGURATION	DESCRIPTION
1		SINGLE POLE DOUBLE BREAK
2		DOUBLE POLE DOUBLE BREAK
3		SINGLE POLE SELECTOR
4		DOUBLE POLE TRIPLE BREAK 1/
5		TRIPLE POLE DOUBLE BREAK

SH 10889

1/ WITH ROTOR CONFIGURATION 4, CONTACT H-1 BREAKS BEFORE C-3 MAKES, AND CONTACTS A-1 AND B-2 MAKE BEFORE A-2 AND B-3 BREAK

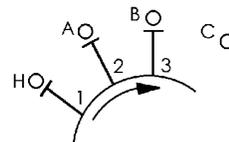


FIGURE 2. Rotor contact configuration.

6.5.3 Style. The style will be designated by two, three, or four letters and will indicate the basic design, construction, and electrical ratings of the switches (see [3.1](#)).

6.5.4 Momentary action. The designation "M" will be used when the switch has one or more momentary positions.

6.5.5 Sections. Unless otherwise specified, the sections designation will be a figure indicating the actual number of sections, decks, or wafers with switching contacts thereon. This figure does not include decks provided for switch positioning by remotely controlled signals.

6.6 Toxic and hazardous material. Toxic and hazardous materials should conform to guideline of [MIL-HDBK-454](#).

6.7 Subject term (keyword) listing.

Circuit
Contact
Resistance
Rotor
Terminal
Voltage

6.8 Sub-contracted material and parts. The packaging or preparation for delivery requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.9 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmentally Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals is available on their website at <http://www.epa.gov/epaoswer/hazwaste/minimize/chemlist.htm>. Further information is available at the following EPA site: <http://www.epa.gov/epaoswer/hazwaste/minimize/>. Included in the EPA list of 31 priority chemicals are cadmium, lead, and mercury. Use of the materials on the list should be minimized or eliminated unless needed to meet the requirements specified herein (see Section 3).

6.10 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue 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 and relationship to the last previous issue.

Custodians:
Navy - SH
DLA - CC

Preparing activity:
DLA - CC

(Project 5930-2009-003)

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 <http://assist.daps.dla.mil/>.