Downloaded from http://www.everyspec.com

INCH-POUND
MIL-PRF-11021G
17 May 1996
MIL-S-11021F
2 September 1992
MS51113C
1 July 1976

PERFORMANCE SPECIFICATION

SWITCH, VEHICULAR LIGHTS: 24 VOLT DC

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

1. SCOPE

1.1 Scope. This specification covers master lighting switches for controlling service and blackout drive, marker, stop and tail, parking, and instrument panel lights on military motor vehicles (see 6.1).

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.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/BLUE, Warren, MI 48397-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

AMSC N/A FSC 2590

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Downloaded from http://www.everyspec.com

2.2 Government document.

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 listed in the issue of Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

DEPARTMENT OF DEFENSE

MIL-R-26	- Resistor, Fixed, Wire Wound (Power Type), Styles RW 80 and RW 81.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-202	- Test Methods for Electronic and Electrical Component Parts.
MIL-STD-1184	- Electrical Components for Automotive Vehicles, Waterproofness Tests.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DRAWINGS

ARMY

7723494	- Electrical Connector, Waterproof.
12369007	- Paint System for Aluminum Interior Surfaces, Light Green.

(Copies of these drawings are available from the U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/BLUE, Warren, MI 48397-5000.)

Downloaded from http://www.everyspec.com

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE J1128	- Low Tension Primary Cable, Standard.
SAE AMS4235	- Aluminum Alloy Casting, Premium Grade, 4.6CU-0.35MN-0.25MG-0.22 TI (A106.0-T71) Solution and Precipitation Heat Treated.
SAE AS478	- Identification Marking Method (DoD Adopted).

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B32	- Standard Specification for Solder Metal.

(Application for copies should be addressed to American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, 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 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.3.

3.2 Materials. Materials shall be uniform and free from imperfections or defects which affect their serviceability. All non-metallic materials shall be inherently fungus resistant or treated to resist fungus growth. All metallic parts shall be made from corrosion resistant steels or treated with corrosion-resistant materials. Asbestos and cadmium materials shall not be used in any form in any part of the switch. No item, part or assembly shall contain radioactive materials in which the specific activity is greater than 0.002 microcuries per gram or activity per item equals or exceeds 0.01 microcuries (see 4.5.1).

Downloaded from http://www.everyspec.com

3.2.1 Dissimilar metals. Separation of dissimilar metals shall be done by insulation between mating surfaces. Except where necessary to complete an electrical circuit, contact between dissimilar metals that would encourage galvanic action shall be avoided (see 4.5.1).

3.2.2 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs (6.3.3).

3.2.3 Process requirements. If the following processes are used to fabricate the switch, conformance to the cited specifications is required.

3.2.3.1 Solder. Solder shall meet the applicable electrical and electronic device solder requirements of ASTM B32 (see 4.5.1).

3.2.3.2 Cast parts. Cast parts shall conform to composition of SAE AMS4235 (see 4.5.1).

3.3 Design and construction. Design and construction shall conform to all of the applicable requirements herein that include operational, environmental, mechanical and electrical interface requirements included on figure 1 (see 4.5.1 and 4.5.2).

3.3.1 Springs. Mechanical springs shall not be used to transmit current (see 4.5.2).

3.3.2 Connector. Connectors shall conform to Drawing 7723494 insert arrangement 28-51. The shell may be integral with its mounting surface (see 4.5.1 and 4.5.2).

3.3.3 Cables. Cables shall meet the requirements of SAE J1128, type GPT, 16 gage (see 4.5.1).

3.3.4 Mechanical interlock. The switch assembly shall incorporate a mechanical interlock to prevent the inadvertent energizing of any part of the light system except the blackout marker lights. To energize the blackout drive lights, the operator must go first to the blackout marker position, then through the mechanical interlock to the blackout drive light position of the switch. To energize the stop/turn lights or service drive lights, the operator must go from the "OFF" position, through the mechanical interlock to the desired switch position (see 4.5.2).

Downloaded from http://www.everyspec.com

3.3.5 Index marking.

3.3.5.1 Identification and color of marking. Index positions shall be identified as specified in figure 1 and applicable drawings (see 4.5.2). Color of the markings shall be base metal or white (see 4.5.2).

3.3.6 Resistor. The panel lamp circuit shall be connected in series with a 30 ohm ± 5 percent (%), five watt resistor conforming to MIL-R-26 (see 4.5.1).

3.3.7 Circuit breaker. The switch assembly shall be equipped with a nominal 20 ampere circuit breaker in accordance with the applicable National Electrical Manufacturers Association (NEMA) standard (see 4.5.2).

3.4 Performance.

3.4.1 Electrical continuity. The switch assembly shown on figure 1 shall close appropriate circuits when main and auxiliary levers are in indexed positions for lamps specified. All other circuits shall remain open. Mechanical interlock shall function as designed, in accordance with 3.3.5 (see 4.5.3).

3.4.2 Voltage drop. When a current load of 10 amperes is applied to each circuit except the panel lamp dim circuit, the voltage drop shall be not more than 500 millivolts (mv). The voltage drop through the panel lamp dim circuit shall be 12 volts ± 10% at 0.40 amperes (see 4.5.4).

3.4.3 Circuit breaker continuous current capacity and ultimate trip current. At each ambient air temperature specified in table I, the switch assembly circuit breaker shall carry the continuous current specified for that temperature without tripping or causing other current interruption. Subsequent to carrying the continuous currents and while at the specified temperatures, the ultimate current load shall be applied and the circuit breaker shall open in not more than 60 minutes (see 4.5.5 and 6.3.1).

3.4.4 Switch lever torque. The torque required to operate the switch levers shall be 0.70 ± 0.15 pound-force foot (lbf-ft) (0.95 ± 0.20 N-m) (see 4.5.6).

3.4.5 Interlock strength. The main switch lever with the mechanical interlock in the lock position shall withstand 3.0 lbf-ft (4.1 N-m) of torque without operating the switch (i.e., only the circuits specified for the tested index position shall have power delivered to them) or damage to the switch assembly (see 4.5.7).

Downloaded from http://www.everyspec.com

3.4.6 Interlock effort. While 0.70 ± 0.15 lbf-ft of torque is applied to the switch assembly's interlock lever, the application of the same amount of torque to the main switch lever shall cause the main switch lever to rotate (see 4.5.8).

3.4.7 Endurance. The switch assembly shall show no evidence of mechanical or electrical failure during or following 50 000 cycles of operation while connected to each of the circuits energized as specified in tables II and III. The values of the parameters measured after endurance testing shall not differ by more than 20% from those measured prior to beginning the test (see 4.5.9).

3.4.8 Dielectric strength. The insulation shall resist the application of 1000 volts root mean square (rms) at 60 cycles per second (cps) without charring, cracking, arcing, rupturing, or other damage (see 4.5.10).

3.4.9 Switch lever position. When the switch levers are indexed as specified (see 3.3.6 and 3.4.10) at each of the switch index positions, the switch levers shall align within 5 degrees of the index mark (see 4.5.11).

3.4.10 Switch lever indexing. The switch assembly levers shall positively index themselves when rotated through all the specified positions. Upon application of 0.10 ± 0.01 lb-ft (0.14 ± 0.014 N-m) of torque, the switch lever shall not move more than 5 degrees (see 4.5.12).

3.5. Environmental and physical.

3.5.1 Waterproofness. The switch assembly shall be waterproofed (see 4.6.1).

3.5.2 Corrosion. The switch assembly shall resist corrosion (see 4.6.2).

3.5.3 Vibration. When subjected to the vibration test as specified in 4.6.3, the current specified in table I shall not deviate from the set current by more than 5% for periods greater than 0.01 second. Subsequent to vibration testing, the switch assembly shall show no evidence of bending, cracking or other physical damage.

3.5.4 Shock. The switch assembly, after being subjected to shock test, shall show no evidence of bending, cracking, or other physical damage and the switch levers shall not be displaced more than 3 degrees. During shock testing, the terminal currents shall meet the requirements of 3.5.3 (see 4.6.4 through 4.6.4.2).

Downloaded from http://www.everyspec.com

3.6 Protective finishes. All frontal exterior metal surfaces shall be painted. The index marks and their identification shall be base metal or white. Surfaces shall be cleaned, conditioned, primed and painted in accordance with Drawing 12369007. The color of paint shall be light green (see 4.5.2).

3.7 Marking. Identification and switch function markings shall be in accordance with SAE AS478. At the manufacturer's option, the information may be cast as an integral part of the switch, clearly and legibly, in a visible location and shall include the following information (see 4.5.2).

a. National stock number (NSN).
b. Manufacturer's serial number.
c. Manufacturer's name or identification code (CAGE).
d. Contractor or order number.
e. Date of manufacture.

3.8 Workmanship. Workmanship shall be in accordance with the manufacture of a high quality switch. This shall be evidenced by the absence of faults which are detrimental to the appearance, serviceability and durability of the switch, and free from burrs, chips, dirt, sharp edges, scratches, unauthorized use of used or reworked parts, improper preparation and assembly of the switch (see 4.5.2).

4. VERIFICATION

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

a. First article inspection (see 4.3).
b. Conformance inspections (see 4.4).
    1. Examination (see 4.4.2).
    2. Tests (see 4.4.3).

4.2 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed under the following standard (room) ambient conditions:

Temperature: 77 ± 5°F (25 ± 3°C).
Relative humidity: (uncontrolled room ambient).
Atmosphere pressure: (site pressure).
Voltage: 28 ± 2 Vdc.

Downloaded from http://www.everyspec.com

4.3 First article inspection. Unless otherwise specified (see 6.2), the Government shall select five switches produced under the production contract for first article inspection. First article samples shall be inspected as specified in table III.

4.3.1 First article test sequence. First article tests shall be conducted on the sample in accordance with the test sequence specified in table III.

4.3.2 First article inspection failure. Deficiencies found during, or as a result of, the first article inspection shall be cause for rejection of the first article sample until evidence has been provided by the contractor that corrective action has been taken to eliminate the deficiency.

4.4 Conformance inspection (CI). CI shall include the examination of 4.4.2 and the tests of 4.4.3. Noncompliance with any of the specified requirements in sections 3 and 5 shall be cause for rejection of the sample and the inspection lot.

4.4.1 Sampling plan. Unless otherwise specified (see 6.2), the sampling plan specified herein shall be used. See 6.3.2 for definitions of sampling inspection terms.

4.4.1.1 Lot formation. An inspection lot shall consist of all the switch assemblies of a single type and part identification number (PIN), from an identifiable production period, from one manufacturer, from one manufacturing location, submitted at the same time for acceptance.

4.4.1.2 Sample. The sample for CI examination and tests shall be randomly selected from the inspection lot in accordance with table IV.

4.4.2 Examination. The sample selected in accordance with 4.4.1.2 shall be examined for the defects as specified in table V (see 4.5.2).

4.4.3 Tests. The sample selected in accordance with 4.4.1.2 shall be tested in the sequence as specified in table VI.

4.4.4 CI failure. Any item that fails to conform to any specified requirement shall be rejected. Any failure (one or more) of the selected sample in either the Major/Minor categories or test for the appropriate inspection lot size shall constitute a failure of the entire lot.

4.5 Methods of inspection.

4.5.1 Materials and construction. Conformance to 3.2, 3.2.1, 3.2.3.1, 3.2.3.2, 3.3, 3.3.2, 3.3.3 and 3.3.6 shall be determined by inspection of contractor records providing proof or certification that design, construction, processing, and materials conform to requirements.

Downloaded from http://www.everyspec.com

Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data.

4.5.2 Defects. Conformance to 3.3 through 3.3.2, 3.3.4 through 3.3.5.1, 3.6, 3.7, and 3.8 shall be determined by examination for the defects listed in table V (see 4.4.2). Examination shall be visual, tactile, or by measurement with standard inspection equipment.

4.5.3 Electrical continuity test. To determine conformance to 3.4.1, the electrical continuity shall be measured at each of the specified switch positions between pin F or pin K, as required, and the remaining pins to complete the specified circuits on figure 1.

4.5.4 Voltage drop test. To determine conformance to 3.4.2, the voltage drop shall be measured at a minimum current of 10 amperes (0.40 ampere for the panel dim circuit) across the circuits as specified in 4.5.3.

4.5.5 Circuit breaker continuous current capacity and ultimate trip current test. To determine conformance to 3.4.3, each switch assembly shall be conditioned at each of the ambient temperatures specified in table I for a minimum of 5 hours. After conditioning, and while still at the temperature, the switch assembly shall be subjected to the continuous current tests as specified in table I for not less than 60 minutes. The switch assembly shall subsequently be subjected to the ultimate trip currents for not more than 60 minutes.

4.5.6 Switch lever torque test. To determine conformance to 3.4.4, the switch assembly shall be mounted in a suitable test fixture with the interlock disengaged as specified (see 4.5.8). For each of the specified positions of each switch lever, the torque shall be gradually applied until the lever rotates to the next adjacent position. The maximum torque measured during rotation is the torque needed to actuate the lever. Each lever shall be rotated in both the clockwise and counterclockwise directions.

4.5.7 Interlock strength test. To determine conformance to 3.4.5, the switch assembly shall be tested as follows. With the mechanical interlock in the lock position, the main switch lever shall withstand a minimum of 3 lbf-ft (4.1 N-m) of torque applied to the switch lever in the plane of the switch rotation clockwise in "off", "stop light" and "service drive" positions. With the mechanical interlock in the lock position, the main switch lever shall withstand a minimum of 3 lbf-ft (4.1 N-m) of torque applied to the switch lever in the plane of the switch rotation counterclockwise in "b.o. marker" and "b.o. drive" positions. There shall be no movement of the main switch lever, or damage to the switch assembly.

Downloaded from http://www.everyspec.com

4.5.8 Interlock effort test. To determine conformance to 3.4.6, the switch assembly shall be mounted in a suitable test fixture and a torque of 0.70 ± 0.15 lbf-ft shall be applied to the main switch lever in each position. The switch assembly shall then be subjected to the test specified in 4.5.6.

4.5.9 Endurance. To determine conformance to 3.4.7, the switch assembly shall first be subjected to tests specified in 4.5.6, 4.5.8, 4.5.11, and 4.5.12. Subsequently, the switch assembly shall be subjected to the tests as specified in 4.5.9.1, 4.5.9.2, and 4.5.9.3.

4.5.9.1 Preparation. Resistive loads shall be connected to the circuits by the cables coming from the specified connector sockets to provide the currents specified in table II. The exact values for each socket shall be recorded prior to start of the 50 000 cycles.

4.5.9.2 Main switch test. The auxiliary switch shall be placed in the "OFF" position. The main switch shall be subjected to the following cycling procedure at a rate of not less than 5 cycles per minute (cpm). One cycle shall consist of the following sequence:

a. With the main switch in the extreme left position (blackout drive), press the interlock lever and move the main switch lever through each position to the extreme right position (service drive), remaining in each position for 1 second; and
b. Release the interlock lever and return to the blackout marker position without stopping, then press the interlock lever to return to the blackout drive position. The main switch shall be operated for 50 000 cycles as follows:

Number of cycles	Ambient temperature
15 000	160 ± 5°F
20 000	80 ± 10°F
15 000	-65 ± 5°F

4.5.9.3 Auxiliary switch test. The main switch shall be placed in the "SERVICE DRIVE" position. The auxiliary switch shall be subjected to the same cycling rate, duration, ambient temperature, and number of cycles as the main switch in 4.5.9.2. One cycle for the auxiliary switch shall consist of moving the auxiliary switch levers from the "OFF" position to the "PANEL BRIGHT" position, back through the "OFF" position to the "PARK" position, and returning to the "OFF" position.

4.5.10 Dielectric strength test. To determine conformance to 3.4.8, the auxiliary and main switch levers shall be placed in the "OFF" position and a 1000 volt rms at 60 cycles per second (cps) shall be applied in accordance with MIL-STD-202, method 301, between each pair

Downloaded from http://www.everyspec.com

of terminals, excepting pair H and M. The same voltage shall also be applied between terminals and grounds. The voltage shall be applied for 1 minute in each position. Switch shall be disassembled and examined. There shall be no evidence of charring, cracking, arcing, rupturing, or other damage.

4.5.11 Switch lever position test. To determine conformance to 3.4.9, the switch lever shall be rotated to each of the specified index positions. To determine the location of the index position, the switch levers shall be subjected to the test as specified in 4.5.12. The angular difference between the center of the switch lever and the index mark shall be within 5° of the index marks.

4.5.12 Switch lever indexing test. To determine conformance to 3.4.10, the total angular displacement of the lever resulting from the application of a clockwise and counterclockwise torque of 0.10 ± 0.01 lb-ft (0.14 ± 0.014 N-m) shall be measured at each specified index position concurrently with the tests as specified in 4.5.3 and 4.5.4. Movement shall not exceed 5 degrees.

4.6 Environmental test.

4.6.1 Waterproofness test. To determine conformance to 3.5.1, the switch assembly shall be subjected to the waterproofness test as specified in MIL-STD-1184, method 100, procedure 1.

4.6.2 Corrosion tests. To determine conformance to 3.5.2, the switch assembly shall be subjected to salt spray (corrosion) test as specified in MIL-STD-202, method 101, for a duration of 200 hours. The switch assembly shall then be subjected to the tests as specified in 4.5.3, 4.5.4, and 4.5.6.

4.6.3 Vibration test. To determine conformance to 3.5.3, the switch assembly shall be connected to circuits as specified in 4.5.9.1 and mounted as in its intended use. The switch assembly shall be subjected to the vibration test as specified in MIL-STD-202, method 204, test condition A. Vibration shall be applied for 1 hour in the three major orthogonal axes of the switch assembly. The main and auxiliary switch levers shall be set at each indicating position for equal periods of time during the test.

4.6.4 Shock test - switch assembly. To determine conformance to 3.5.4, the switch assembly shall be connected to circuits as specified in 4.5.9.1, mounted as in its intended use, and tested as specified in 4.6.4.1 and 4.6.4.2.

4.6.4.1 Shock test - switch lever. The main switch lever shall be placed in the BLACKOUT DRIVE position and the auxiliary switch lever in the PANEL DIM position. The position of the levers shall be the measured. Subsequently, the switch assembly shall be subjected to the shock test specified in MIL-STD-202, method 213, test condition G, except the shock

Downloaded from http://www.everyspec.com

pulse shall be 100 peak gravity (g). The shock pulse shall be applied in the direction of the three major orthogonal axes of the switch assembly. Subsequent to this shock testing, the position of the specified levers shall be measured as specified. The differences in their positions is the movement of the levers.

4.6.4.2 Shock test - connector. The test shall be as specified in 4.6.4.1 with the following exceptions:

a. The cables shall be mounted to structures that move with the switch assembly.
b. A minimum of 8 inches (20 centimeters (cm)) of cable shall be unsupported behind the rear of the connector.
c. The shock pulse shall be 50 peak. If the test set-up specified in this paragraph is used in 4.6.4.1, this test may be omitted.

TABLE I. Continuous current capacities and ultimate trip current.

Ambient air temperature	Continuous current capacity (minimum amperes)	Ultimate trip current (maximum amperes)
77 ± 5°F (25 ± 2.8°C)	23.0	27.6
-65 ± 5°F (-53.9 ± 2.8°C)	28.0	39.2
165 ± 5°F (73.9 ± 2.8°C)	17.0	24.4

TABLE II. Socket current loads.

Socket	Current (amperes) (± 5%)
C	2.0
D	1.2
E	4.4
H	1.4
J	2.0
L	1.5
M	5.7
N	0.7

Downloaded from http://www.everyspec.com

TABLE III. Order of first article test.

Test Requirement	Test Procedure	Test Title
Sample A		
3.2 thru 3.3.7	4.5.1 and 4.5.2	Materials and construction/defects
3.4.1	4.5.3	Electrical continuity
3.4.2	4.5.4	Voltage drop
3.5.3	4.6.3	Vibration
3.5.1	4.6.1	Waterproofness
3.4.1	4.5.3	Electrical continuity
Sample B		
3.2 thru 3.3.7	4.5.1 and 4.5.2	Materials and construction/defects
3.4.1	4.5.3	Electrical continuity
3.4.2	4.5.4	Voltage drop
3.5.4	4.6.4	Shock
3.5.1	4.6.1	Waterproofness
3.4.1	4.5.3	Electrical continuity
3.4.2	4.5.4	Voltage drop
Sample C		
3.2 thru 3.3.7	4.5.1 and 4.5.2	Material and construction/defects
3.4.1	4.5.3	Electrical continuity
3.4.2	4.5.4	Voltage drop
3.4.7	4.5.9	Endurance
3.4.1	4.5.3	Electrical continuity
3.4.2	4.5.4	Voltage drop
Sample D		
3.2 thru 3.3.7	4.5.1 and 4.5.2	Materials and construction/defects
3.4.1	4.5.3	Electrical continuity
3.4.2	4.5.4	Voltage drop
3.5.2	4.6.2	Corrosion
3.4.8	4.5.10	Dielectric strength
3.4.1	4.5.3	Electrical continuity
3.4.2	4.5.4	Voltage drop
3.4.6	4.5.8	Interlock effort
3.4.5	4.5.7	Interlock strength
3.4.4	4.5.6	Switch lever torque
3.4.9	4.5.11	Switch lever position
3.4.10	4.5.12	Switch lever indexing
3.4.1	4.5.3	Electrical continuity

Downloaded from http://www.everyspec.com

TABLE III. Order of first article test - Continued.

Test Requirement	Test Procedure	Test Title
3.4.2	4.5.4	Voltage drop
Sample E		
3.2 thru 3.3.7	4.5.1 and 4.5.2	Materials and construction/defects
3.4.1	4.5.3	Electrical continuity
3.4.2	4.5.4	Voltage drop
3.4.3	4.5.5	Circuit breaker continuous current capacity and ultimate trip current
3.4.1	4.5.3	Electrical continuity
3.4.2	4.5.4	Voltage drop

TABLE IV. Sampling plan for CI.

CI sampling plan			
Inspection lot size	Sample size		
	Examination		Test
	Major	Minor	
2 to 8	*	5	2
9 to 15	13	5	2
16 to 25	13	5	2
26 to 50	13	5	5
51 to 90	13	7	5
91 to 150	13	11	6
151 to 280	20	13	7
281 to 500	29	16	9
501 to 1200	34	19	11
1201 to 3200	42	23	13
3201 to 10 000	50	29	15
10 001 to 35 000	60	35	15
35 001 to 150 000	74	40	15
150 001 to 500 000	90	40	15
500 001 to over	102	40	15

Downloaded from http://www.everyspec.com

TABLE V. Classification of defects

Categories	Characteristics	Method of inspection
Major:		
101	Improper materials (see 3.2).	Visual
102	Dimensions affecting interchangeability (see 3.3).	SIE 1/
103	Mechanical springs are used to transmit current (see 3.3.1).	Visual
104	Improper connector (see 3.3.2).	Visual
105	Improper mechanical interlock (see 3.3.4).	Visual
106	Improper index marking and color (see 3.3.5).	Visual
107	Improper resistor (see 3.3.6).	Visual
108	Improper size and installation of circuit breaker (see 3.3.7).	SIE/Visual
109	Improper protective finish and color (see 3.6).	Visual
Minor:		
201	Dimensions not affecting interchangeability (see 3.3).	SIE
202	Improper identification marking (see 3.7).	Visual
203	Workmanship (see 3.8).	Visual

1/ SIE = Standard Inspection Equipment.

TABLE VI. Order of acceptance test.

Test Title	Requirement	Procedure
Materials and construction/defects	3.2 thru 3.3.7	4.5.1 and 4.5.2
Circuit breaker continuous current capacity and ultimate trip current	3.4.3	4.5.5
Electrical continuity	3.4.1	4.5.3
Voltage drop	3.4.2	4.5.4
Interlock effort	3.4.6	4.5.8
Interlock strength	3.4.5	4.5.7
Switch lever torque	3.4.4	4.5.6
Switch lever position	3.4.9	4.5.11
Switch lever indexing	3.4.10	4.5.12

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory

Downloaded from http://www.everyspec.com

Control point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. 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 which may be helpful, but is not mandatory.)

6.1 Intended use. The switch covered by this specification is intended for use as a master lighting control switch in military vehicles. The switch is equipped with an automatic interlock to prevent the accidental energizing of any lights except the blackout marker lights.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.
b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1, 2.2.2, and 2.3).
c. If first article inspection is required (see 3.1).
d. If sample size for first article inspection should be other than as specified (see 4.3).
e. If sampling plan should be other than as specified (see 4.4.1).
f. Packaging requirements (see 5.1).

6.3 Definitions.

6.3.1 Tripped. For the purpose of this specification, tripped means that the circuit breaker opened its electric circuit.

6.3.2 Definitions of terms used in sampling inspection.

a. Classification of defects. A classification of defects is the enumeration of possible defects of the unit of product classified according to their seriousness. A defect is any nonconformance of the unit of product with specified requirements. Defects will normally be grouped into one or more of the following classes: critical, major, and minor defects. Also, defects may be grouped into other classes or into subclasses within these classes.
b. Critical defective. A critical defective is a unit of product which contains one or more critical defects and may also contain major and/or minor defects.
c. Defective. A defective is a unit of product which contains one or more defects.

Downloaded from http://www.everyspec.com

d. Formation of lots or batches. The product should be assembled into identifiable lots, sublots, batches, or in such other manner as may be prescribed (see l). Each lot or batch should, as far as is practicable, consist of units of product of a single type, grade, class, size, and composition, manufactured under essentially the same conditions, and at essentially the same time.

e. Lot or batch. The term lot or batch means "inspection lot" or "inspection batch", i.e., a collection of units of product from which a sample is to be drawn and inspected and may differ from a collection of units designated as a lot or batch for other purposes (e.g., production, shipment, etc.).

f. Lot or batch size. The lot or batch size is the number of units of product in a lot or batch.

g. Major defect. A major defect is a defect, other than critical, that is likely to result in failure, or to reduce materially the usability of the unit of product for its intended purpose.

h. Major defective. A major defective is a unit of product which contains one or more major defects, and may also contain minor defects but contains no critical defect.

i. Minor defect. A minor defect is a defect that is not likely to reduce materially the usability of the unit of product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit.

j. Minor defective. A minor defective is a unit of product which contains one or more minor defects but contains no critical or major defect.

k. Presentation of lots or batches. The formation of the lots or batches, lot or batch size, and the manner in which each lot or batch is to be presented and identified by the supplier should be designated or approved by the responsible authority. As necessary, the supplier should provide adequate and suitable storage space for each lot or batch, equipment needed for proper identification and presentation, and personnel for all handling of product required for drawing of samples.

l. Representative sampling. When appropriate, the number of units in the sample should be selected in proportion to the size of sublots or subbatches, or parts of the lot or batch, identified by some rational criterion. When representative sampling is used, the units from each part of the lot or batch should be selected at random.

m. Sample. A sample consists of one or more units of product drawn from a lot or batch, the units of the sample being selected at random without regard to their quality. The number of units or product in the sample is the sample size.

n. Sampling plan. A sampling plan indicates the number of units of product from each lot or batch which are to be inspected (sample size or series of sample sizes) and the criteria for determining the acceptability of the lot or batch (acceptance and rejection numbers).

Downloaded from http://www.everyspec.com

o. Time of sampling. Samples may be drawn after all the units comprising the lot or batch have been assembled, or samples may be drawn during assembly of the lot or batch.

6.3.3 Recovered materials. "Recovered materials" means materials that have been collected or recovered from solid waste (see 6.3.4).

6.3.4 Solid waste. "Solid waste" means (a) any garbage, refuse, or sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility; and (b) other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining and agricultural operations, and from community activities. It does not include solid or dissolved materials in domestic sewage, or solid or dissolved material in irrigation return flows, or industrial discharges which are point sources subject to permits under section 402 of the Clean Water Act, (33 U.S.C. 1342 et seq.), or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) (Source: Federal Acquisition Regulations, section 23.402).

6.4 Subject term (key word) listing.

Blackout marker lights
Instrument panel
Lighting control
Master lighting
Stop light
Tail light

6.5 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Downloaded from http://www.everyspec.com

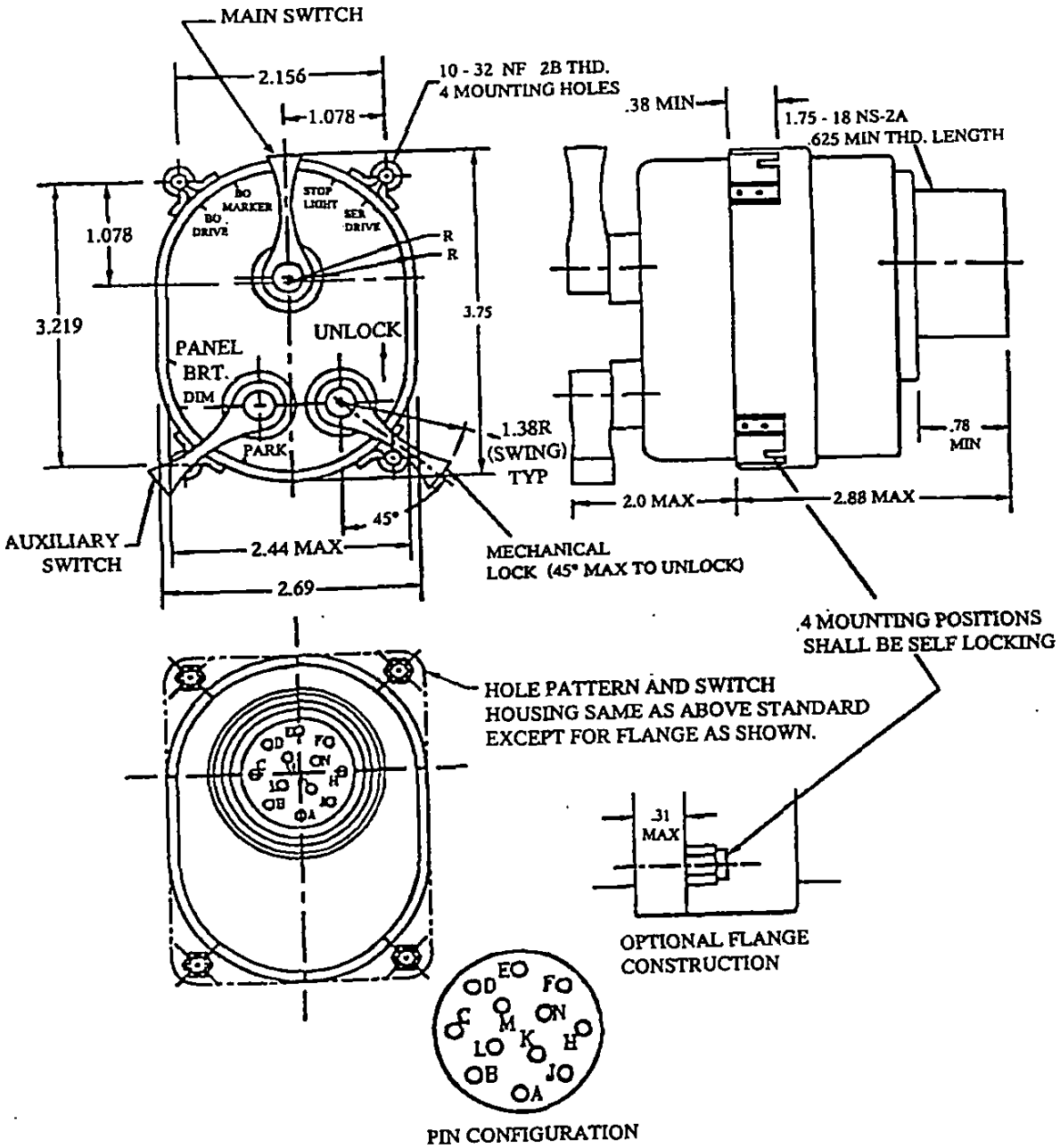

FIGURE 1. Vehicular light switch.

Downloaded from http://www.everyspec.com

NOTES:

1. Unless otherwise specified dimensions are in inches: Tolerances ± 0.005 on decimals ± 5° on angular dimensions.
2. This drawing is not intended to limit construction to features other than shown hereon by dimensions, notations and referenced documents.

SWITCH POSITION DATA

OFF POSITION - MAIN SWITCH - ALL CIRCUITS OPEN

BLACKOUT MARKER POSITION - MAIN SWITCH
Battery to blackout marker and clearance lamps.
Battery to blackout tail lamp.
Battery to feed to blackout turn indicator switch.
Battery to feed to stop lamp switch.
Stop lamp switch (dead side) to blackout stop lamp.
Auxiliary switch can be moved to off, dim or bright panel lamps.

BLACKOUT DRIVE POSITION - MAIN SWITCH
Battery to blackout marker and clearance lamps.
Battery to blackout tail lamp.
Battery to feed to blackout turn indicator switch.
Battery to feed to stop lamp switch.
Battery to blackout driving lamp.
Stop lamp switch (dead side) to blackout stop lamp.
Auxiliary switch can be moved to off, dim or bright panel lamps.

STOP LIGHT POSITION - MAIN SWITCH
Battery to feed to service turn indicator switch.
Battery to feed to stop lamp switch.
Stop lamp switch (dead side) to service stop lamp.
Auxiliary switch can be moved to off, dim or bright panel lamps.

FIGURE 1. Vehicular light switch - Continued.

Downloaded from http://www.everyspec.com

SERVICE DRIVE POSITION - MAIN SWITCH
Battery to feed to service turn indicator switch.
Battery to feed to stop lamp switch.
Battery to service tail lamp.
Battery to clearance lamp.
Battery to service headlamps.
Stop lamp switch (dead side) to service stop lamp.
Auxiliary switch can be moved to parking lamps, plus dim panel lamps or service headlamps with off, dim or bright panel lamps.

12 PIN CONNECTOR (28-51P)	
PIN	CONNECTS TO:
A	STOP LAMP SWITCH
B	PANEL LAMPS
C	SERVICE STOP LAMP
D	BLACKOUT DRIVING LAMP
E	BLACKOUT CLEARANCE LAMP
	BLACKOUT MARKER LAMP
	BLACKOUT TURN INDICATOR L & R
	BLACKOUT TAIL LAMP
F	BATTERY
H	SERVICE TAIL LAMP
	SERVICE CLEARANCE LAMP
J	SERVICE TURN INDICATOR L & R
K	STOP LAMP SWITCH (DEAD SIDE)
L	PARKING LAMPS
M	SERVICE HEADLAMP
N	BLACKOUT STOP LAMP

FIGURE 1. Vehicular light switch - Continued.

Downloaded from http://www.everyspec.com

Custodians:
Army - AT
Navy - YD1
Air Force - 99

Review Activities:
Navy - MC
DLA - CS

Preparing Activity:
Army - AT

(Project 2590-0240)

Downloaded from http://www.everyspec.com

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	MIL-PRF-11021G	960517

3. DOCUMENT TITLE

Switch, Vehicular Lights: 24 Volt DC

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE (Include Area Code) (1) Commercial	(2) AUTOVON
	(810) 574-8745	786-8745
c. ADDRESS (Include Zip Code) Commander U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/BLUE, Warren, MI 48397-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	