

MIL-R-13718C
30 September 1981
SUPERSEDING
MIL-R-13718B
12 November 1969

MILITARY SPECIFICATION

RELAYS, ELECTROMAGNETIC 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 24 volt direct current (Vdc) electromagnetic relays (see 6.1).

1.2 Classification. Relays shall be of the following types and grades as specified (see 6.2):

Type I	- Continuous duty.
Type II	- Intermittent duty.
Grade A	- Waterproof.
Grade B	- Nonwaterproof.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks Unless otherwise specified, the following specifications, standards, and handbooks, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

L-P-509	- Plastic Sheet, Rod and Tube, Laminated, Thermosetting.
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Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Tank-Automotive Command, ATTN: DRSTA-GSS, Warren, MI 48090, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

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| MIL-M-14 | - Molding Plastics and Molded Plastic Parts, Thermosetting. |
| MIL-P-514 | - Plates, Identification, Instruction and Marking, Blank. |
| MIL-R-6106 | - Relays, Electric, General Specification for. |

STANDARDS

FEDERAL

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| FED-STD-H28/2 | Screw Thread Standards for Federal Services. |
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| MIL-STD-105 | Sampling Procedures and Tables for Inspection by Attributes. |
| MXL-STD-130 | Identification Marking of US Military Property. |
| MIL-STD-193 | Finishing Procedures, Tactical Vehicles, (Tracked and Wheeled). |
| MIL-STD-202 | Test Methods for Electronic and Electrical Component Parts. |
| MIL-STD-454 | Standard General Requirements for Electronic Equipment. |
| MIL-STD-810 | Environmental Test Methods. |
| MIL-STD-889 | Dissimilar Metals. |
| MIL-sTD-1184 | Electrical Components for Automotive Vehicles; Waterproofness Tests. |

2.1.2 Other Government documents, and Government drawings and publications. The following documents, drawings, and publications form a part of this specification to the extent specified herein.

DRAWINGS

ARMY

- | | |
|----------|-------------------------------|
| 7717664 | - Relay, Current. |
| 8724750 | - Relay and Housing Assembly. |
| 8762321 | - Relay, Solenoid. |
| 10984808 | - Relay and Housing Assembly. |

(Copies of specifications, standards, handbooks, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity, or as directed by the contracting officer.)

2.1.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

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3. REQUIREMENTS

3.1 First article. A first article sample shall be produced and tested prior to manufacture of relays in production quantities. First article sample shall pass inspection specified herein (see 4.4), and shall be representative of all relays to be furnished to the Government under this specification. Approval of first article samples shall not relieve the contractor of responsibility to provide relays in production quantities which conform to approved first article samples. Any deviation in production units from approved first article samples shall be subject to approval of the contracting officer.

3.2 Materials. Materials shall be as specified herein and in referenced specifications, standards, and drawings. Material shall be free of defects which adversely affect performance or serviceability of the finished product (see 6.5).

3.2.1 Dissimilar metals. Dissimilar metals shall be protected from galvanic corrosion in accordance with requirements of MIL-STD-889.

3.2.2 Metals. Exterior metals shall be of a corrosion resistant type, or shall be treated to resist corrosion.

3.2.3 Insulation.

3.2.3.1 Molded. Molded insulation materials shall conform to MIL-M-14, except that cotton or cellulose-filled molded materials shall not be used.

3.2.3.2 Laminated. Laminated insulation materials shall conform to L-P-509, except that cotton base laminates shall not be used.

3.3 Design and construction. Relays shall be constructed to form and dimensions specified on drawing 7717664, 8724750, 8762321 or 10984808, or as specified (see 6.2). Rating of equipment shall be as specified on drawing and shall be based upon an ambient temperature of $77^{\circ} \pm 15^{\circ}\text{F}$.

3.3.1 Interchangeability. To provide for interchangeability, relays fabricated in accordance with this specification shall have external dimensions that fall within envelope outline of applicable drawing. Electrical connectors, mounting dimensions and location shall also conform to detail requirements of applicable document.

3.3.2 Standard parts. Military standard parts shall be incorporated whenever possible. Commercial standard parts may be used, provided they are interchangeable with military standard parts without modification.

3.3.3 Threaded parts. Screw threads of the form, number per inch, and class specified on the applicable drawing or military standard shall be in accordance with FED-STD-H28/2.

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3.3.3.1 Locking devices. Lock washers, self-locking nuts, safety wires, or other approved locking devices shall be incorporated where specified, or where required to prevent loosening of components.

3.3.4 Electrical terminals. Terminals shall conform to applicable drawings, specifications, and standards. Terminals shall have normal current conducting path.

3.3.5 Electrical connectors. Connectors shall conform to applicable drawings, specifications, and standards.

3.3.6 Mounting. When brackets are used, they shall be an integral part of relay housing, or shall be securely attached thereto to prevent any movement between relay and mounting bracket in service, and to permit electrical contact to ground, if needed.

3.3.6.1 Ground. The finish around mounting holes shall permit electrical contact to ground when relay is mounted as in intended use. Requirement does not apply to relays mounted on insulated bases.

3.3.6.2 position. Relay shall operate as specified when mounted in any position.

3.3.7 Soldering. Soldering shall conform to requirement 5 of MIL-STD-454.

3.3.8 Polarity. Relays shall operate in negatively grounded circuit.

3.3.9 Mechanical failure. Construction shall be such that failure of linkage between actuator and movable contacts will result in contacts moving to deenergized position when relay is deenergized.

3.3.9.1 Springs. Springs shall not be used to transmit current.

3.3.10 Weight. Weight of relay shall conform to applicable drawings, specifications, and standards.

3.4 Performance.

3.4.1 Terminal torque resistance. External terminal shall withstand 25 inch-pounds torque without damage to terminals or adjacent parts.

3.4.2 Connector strength. Connector shall withstand a load of 20 pounds, applied along connector centerline in a direction away from relay housing, without deformation which would prevent attachment of mating connector.

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3.4.3 Dielectric withstanding voltage. Relay shall withstand an applied voltage of 500 volts root mean square (rms) at a frequency of 60 hertz (Hz) for 60 seconds between terminals, and between each contact terminal and each coil terminal. Insulation materials shall evidence no burning, charring, smoking, or rupture. Relay shall subsequently meet the requirements of 3.4.6.

3.4.4 Pickup voltage. Relay pickup voltage shall not exceed maximum value specified on applicable drawings, specifications, and standards in any air temperature between 170°F and minus 70°F.

3.4.5 Dropout voltage. Relay dropout voltage shall conform to applicable drawings, specifications, and standards in any ambient air temperature between 170°F and minus 70°F.

3.4.6 Contact voltage drop. Voltage drop across relay contacts, measured at relay terminals, shall be not more than 150 millivolts, except after overload (see 3.4.7), endurance (see 3.4.8), inductive load (see 3.4.11), or vibration (see 3.4.13) performance.

3.4.7 Overload. Relay shall withstand 50,000 cycles of making and breaking in circuit with a resistive load equal to 2.5 times normal resistive load rating. Thereafter, voltage drop across relay contacts, measured at relay terminals, shall be not more than 250 millivolts (see 3.4.6).

3.4.8 Endurance. Relay shall withstand 100,000 cycles of making and breaking in circuit with a resistive load equal to normal resistive load rating. Thereafter, voltage drop across relay contacts measured at relay terminals shall be not more than 250 millivolts (see 3.4.6).

3.4.9 Coil current. Coil current shall conform to values specified on applicable drawings, specifications, and standards when relay is subjected to maximum operating voltage applied to coil terminals.

3.4.10 Contact bounce and operating time. Contact bounce and operating time shall conform to applicable drawings, specifications, and standards.

3.4.11 Inductive load. In an inductive load circuit conforming to applicable drawing, relay shall withstand 10,000 cycles of operation. Thereafter, voltage drop across relay contacts measured at relay terminals shall be not more than 250 millivolts (see 3.4.6).

3.4.12 Transient voltage characteristics. Any voltage spike generated by relay shall be not more than plus or minus 250 volts.

3.4.13 Vibration. Relay shall withstand vibration test specified in method 514, procedure VIII, category f (curve W) of MIL-STD-810. Thereafter, relay shall withstand 100 cycles of making and breaking in circuit with a

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resistive load equal to normal resistive load rating (see 3.4.8). Thereafter, voltage drop across relay contacts measured at relay terminals shall be not more than 250 millivolts (see 3.4.6).

3.4.14 Waterproofness. Grade A relay shall withstand applicable waterproofness test specified in MIL-STD-1184.

3.4.15 Shock. Relay shall withstand shock test specified in method 516, procedure I, sawtooth pulse, of MIL-STD-810. Thereafter, contact bounce and operating time shall conform to applicable drawings, specifications, and standards (see 3.4.10).

3.4.16 Corrosion resistance. Relay shall withstand 200 hours of corrosion resistance test (salt fog) specified in method 509 of MIL-STD-810 without corrosion that adversely affects performance. Thereafter, relay shall conform to 3.4.4 and 3.4.5, and shall withstand 500 cycles in conformance to 3.4.8

3.4.17 Fungus resistance. Relay shall withstand 90 days of fungus resistance test specified in method 508 of MIL-STD-810 without fungus growth that adversely affects performance. Thereafter, relay shall conform to 3.4.4 and 3.4.5, and shall withstand 500 cycles in conformance to 3.4.8.

3.5 Finish. Cleaning, pretreatment, priming, and painting shall conform to MIL-STD-193. Paint shall not be applied to any grounding surfaces (see 3.3.6.1).

3.6 Marking.

3.6.1 Identification marking. Identification marking shall be in accordance with MIL-STD-130 and shall include the following:

Nomenclature
Rating: 24 Volts, amperes
Military part number (see 6.2)
Federal stock number
Manufacturer's name or identification
Contract number
Date of manufacture (month, year, e.g.,
May 69)

3.6.2 Nameplate. When specified on the applicable drawing, nameplates shall conform to MIL-P-514.

3.7 Workmanship. Workmanship shall be such as to assure a product free of burrs, rust, scratches, chips, sharp edges, loose or defective connectors, cracked insulation and faulty soldering.

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4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Materials. The contractor's inspection records shall be examined to determine conformance to 3.2.

4.2 Classification of inspections. Inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.4).
- b. Quality conformance inspection (see 4.5).

4.3 Inspection conditions. Inspection shall be conducted under general conditions acceptable to the Government. Unless otherwise specified, all tests shall be conducted on samples that have been temperature stabilized for 24 hours at $77^{\circ} \pm 15^{\circ}\text{F}$; however, soaking need not be repeated where tests are continuous at that temperature.

4.3.1 Temperature extremes. When extreme temperatures are required, they shall be as follows:

4.3.1.1 Low temperature. Relay shall be subjected to a temperature of $\text{minus } 65^{\circ} \pm 5^{\circ}\text{F}$ for 24 hours prior to inspection.

4.3.1.2 High temperature. Relay shall be subjected to temperature of plus $165^{\circ} \pm 5^{\circ}\text{F}$ for 24 hours prior to inspection.

4.3.2 Apparatus. In addition to standard measuring equipment (see table I and applicable test specifications), apparatus shall include a testing chamber capable of maintaining specified air temperatures over the range from minus 70°F to plus 170°F . Air movement in high temperature chamber shall be held to a minimum to prevent a temperature gradient within chamber and cooling resulting from excess air motion. There shall also be a submersion tank with a pneumatic pump capable of producing and maintaining a pressure of six pounds per square inch (psi), or a vacuum of six psi.

4.3.3 Calibration of inspection equipment. Unless otherwise specified herein, inspection equipment shall measure and read in increments equal to not more than 10 percent of the tolerance allowed in drawing or inspection method.

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Calibration of equipment shall be conducted at intervals sufficient to establish required accuracy. Records of calibration shall be made available to the Government. The inspector may refuse to approve an inspection where accuracy of equipment has not been established to the satisfaction of the Government. Required measuring instrument tolerances are listed in table I.

TABLE 1. Measuring instrument tolerances.

Measuring instrument	Accuracy - maximum deviation
Voltmeter DC	± 0.50 percent
Ammeter DC (multi-range)	± 0.50 percent
Millivoltmeter	± 0.50 percent

4.4 First article inspection. Six sample relays shall be subjected to first article inspection. First article inspection shall consist of examination specified in 4.5.2.2, and tests specified in table II.

TABLE II. Order of first article testing.

Specimen No.	Requirement	Test
1 and 2	3.4.4	4.6.4 Pickup voltage
	3.4.5	4.6.5 Dropout voltage
	3.4.6	4.6.6 Contact voltage drop
	3.4.3	4.6.3 Dielectric withstanding voltage
	3.4.9	4.6.9 Coil current
	3.4.11	4.6.11 Inductive load
	3.4.17	4.6.17 Fungus resistance
	3.4.6	4.6.6 Contact voltage drop
3 and 4	3.4.4	4.6.4 Pickup voltage (77° + 15°F only)
	3.4.5	4.6.5 Dropout voltage (77° + 15°F only)
	3.4.6	4.6.6 Contact voltage drop
	3.4.3	4.6.3 Dielectric withstanding voltage
	3.4.7	4.6.7 Overload
	3.4.6	4.6.6 Contact voltage drop
	3.4.14	4.6.14 Waterproofness (grade A)
	3.4.12	4.6.12 Transient voltage characteristics
	3.4.13	4.6.13 Vibration

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TABLE 11. Order of first article testing. - Continued

Specimen No.	Requirement	Test
3 and 4 Continued	3.4.6	4.6.6 Contact voltage drop
	3.4.15	4.6.15 Shock
	3.4.10	4.6.10 Contact bounce and operating time
	3.4.16	4.6.16 Corrosion resistance
	3.4.6	4.6.6 Contact voltage drop
5 and 6	3.4.4	4.6.4 Pickup voltage (77° + 15°F only)
	3.4.5	4.6.5 Dropout voltage (77° + 15°F only)
	3.4.3	4.6.3 Dielectric withstanding voltage
	3.4.6	4.6.6 Contact voltage drop
	3.4.1	1/ Terminal torque resistance
	3.4.2	1/ Connector strength
	3.4.8	4.6.8 Endurance
	3.4.6	4.6.6 Contact voltage drop

1/ As applicable.

4.4.1 Failure. Failure of any sample to conform to any requirement specified herein shall cause the Government to withhold approval of first article until action by the contractor, to correct defects and prevent recurrence, has been approved by the Government.

4.5 Quality conformance inspection.

4.5.1 Sampling.

4.5.1.1 Lot formation. A lot shall consist of all relays of one part number, from an identifiable production period, from one manufacturer, submitted at one time for acceptance.

4.5.1.2 Sampling for examination. Samples for quality conformance examination shall be selected in accordance with MIL-STD-105.

4.5.1.3 Sampling for acceptance testing. Samples shall be selected in accordance with level S-3 of MIL-STD-105.

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4.5.2 Quality conformance examination.

4.5.2.1 Acceptable quality level. Each relay selected in accordance with 4.5.1.2 shall be examined for conformance to the following acceptable quality levels (AQL's) on the basis of percent defective:

<u>Classification</u>	<u>AQL</u>
Major	1.0
Minor	2.5

4.5.2.2 Classification of defects. For examination purposes, defects shall be classified as specified in table III.

TABLE 111. Classification of defects.

Categories	Defects	Method of inspection
Major		
101	Dimensions affecting interchangeability, not within tolerance (see 3.3)	SIE <u>1/</u>
102	Polarity reversed (see 3.3.8)	SIE <u>1/</u>
103	Inadequate locking devices (see 3.3.3.1)	visual
104	Terminals not as specified (see 3.3.4)	Visual-SIE <u>1/</u>
105	Springs (see 3.3.9.1)	SIE <u>1/</u>
106	Paint on grounding surfaces (see 3.5)	Visual
Minor		
201	Dimensions not affecting interchangeability, not within tolerance (see 3.3)	SIE <u>1/</u>
202	Improper finish (see 3.5)	Visual
203	Improper marking (see 3.6)	Visual
204	Faulty workmanship (see 3.7)	Visual

1/ Standard Inspection Equipment

4.5.3 Classification of tests. Tests shall be classified as follows:

- a. Acceptance tests (see 4.5.4).
- b. Control tests (see 4.5.5).

4.5.4 Acceptance tests. Samples selected in accordance with 4.5.1.3 shall be subjected to tests specified in table IV using an AQL of 6.5 on the basis of percent defective.

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TABLE IV. Order of acceptance testing.

Requirement	Test
3.4.4	4.6.4 Pickup voltage ($77^{\circ} \pm 15^{\circ}\text{F}$ only)
3.4.5	4.6.5 Dropout voltage ($77^{\circ} \pm 15^{\circ}\text{F}$ only)
3.4.6	4.6.6 Contact voltage drop

4.5.5 Control test.

4.5.5.1 Sampling for control test. Relays shall be selected at the rate of two of each 500 produced or fraction thereof, providing that not less than two nor more than four units shall be selected in any 30-day period. Control test samples shall be identified as to production period and, after having been examined for defects specified in 4.5.2.2, shall be subjected to tests specified in table V in the order listed.

TABLE V. Order of control testing.

Requirement	Test
3*4.4	4.6.4 Pickup voltage ($77^{\circ} \pm 15^{\circ}\text{F}$ only)
3.4.5	4.6.5 Dropout voltage ($77^{\circ} \pm 15^{\circ}\text{F}$ only)
3.4.6	4.6.6 Contact voltage drop
3.4.9	4.6.9 Coil current
3.4.3	4.6.3 Dielectric withstanding voltage
3.4.11	4.6.11 Inductive load

4.5.5.2 Failure. Failure of any control test sample to pass any examination or test specified herein may be cause, at the option of the Government, for refusal to accept subsequent lots until faults revealed by test have been corrected.

4.6 Conformance verification.

4.6.1 Terminal torque resistance test (external). To determine conformance to 3.4.1, with relay mounted as in intended use, a force of 25 inch-pounds of torque shall be applied at base of terminal for one minute.

4.6.2 Connector strength test. To determine conformance to 3.4.2, with relay mounted as in intended use, a load of 20 pounds shall be applied gradually to connector in direction away from relay housing.

4.6.3 Dielectric withstanding voltage test. To determine conformance to 3.4.3, relay shall be subjected to test specified in method 301 of MIL-STD-202. Applied voltage shall be 500 volts AC rms, at a frequency of

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of 60 cycles per second (Hz), for 60 seconds between each terminal, and between each contact terminal and each coil terminal. Test voltage ground shall be applied, and reduced, at a maximum rate of change of 250 volts per second. High voltage source shall be rated at a minimum of 1 KVA. Relay shall subsequently be subjected to test specified in 4.6.6.

4.6.4 Pickup voltage test. To determine conformance to 3.4.4, after relay has been temperature stabilized, relay shall be energized several times until stability of pickup voltage readings indicates that residual magnetism has built up to normal value. Relay shall then be tested for 10 cycles (reenergize and energize) to determine that energized function is completed when a potential not in excess of pickup voltage specified on the applicable drawing is applied. A suitable indicating device shall be used to determine that contacts operate satisfactorily. Upon completion, test shall be repeated in turn at ambient air temperatures specified in 4.3.1.1 and 4.3.1.2.

4.6.5 Dropout voltage test. To determine conformance to 3.4.5, after it has been temperature stabilized, relay shall be energized with 28 Vdc. Voltage shall then be reduced. Relay shall release to deenergized position within limits of dropout voltage as specified on applicable drawing. Repeat for 10 cycles. A suitable device shall be used to determine that contacts operate satisfactorily. Upon completion, test shall be repeated in turn at ambient air temperatures specified in 4.3.1.1 and 4.3.1.2.

4.6.6 Contact voltage drop test. To determine conformance to 3.4.6, after it has been temperature stabilized, relay shall be subjected to rated ampere load through contacts, and 28 Vdc on coil. Voltage drop across contact terminals shall be measured within 10 seconds after contacts close. Contacts shall be caused to break, and then to make, test current before each measurement. Average of 10 consecutive and individual readings shall be recorded.

4.6.7 Overload test. To determine conformance to 3.4.7, after it has been temperature stabilized, relay shall be energized with 28 Vdc. Minimum voltage at contacts under load shall be 24 volts. Relay shall be subjected to following overload test:

4.6.7.1 Type I. Relay shall be operated for 50,000 cycles making and breaking a resistive load equal to 2.5 times normal resistive load rating. Duty cycle shall be $0.2 \pm .05$ second on, 20.0 ± 1.0 seconds off. At conclusion of test, relay shall be subjected to 1 cycle of operation, energized at foregoing load for a period of 30 seconds. Subsequently, relay shall be tested as specified in 4.6.6.

4.6.7.2 Type II. Relay shall be subjected to tests specified in 4.6.7.1, except that duty cycle shall be 1.0 second on, 60 seconds off.

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4.6.8 Endurance test. To determine conformance to 3.4.8, relay shall be energized with 28 Vdc. Minimum voltage at contacts under load shall be 24 volts. Relay shall be subjected to following endurance test:

4.6.8.1 Type I. Relay shall be operated for 100,000 cycles making and breaking a resistive load equal to its normal resistive load rating. Duty cycle shall be 0.5 ± 0.05 second on, 2.5 ± 0.1 seconds off. 100,000 cycles of operation shall be conducted at following ambient air temperatures:

<u>Number of cycles</u>	<u>Temperature</u>
25,000	plus $160^{\circ} \pm 5^{\circ}\text{F}$
25,000	minus $65^{\circ} \pm 5^{\circ}\text{F}$
50,000	plus $77^{\circ} \pm 15^{\circ}\text{F}$

Prior to operation at each temperature, relay shall have been stabilized at that temperature for 24 hours. Subsequently, relay shall be tested as specified in 4.6.6.

4.6.8.2 Type II. Relay shall be subjected to test specified in 4.6.8.1, except that duty cycle shall be 0.5 ± 0.05 second on, 10.0 ± 0.10 seconds off.

4.6.9 Coil current test. To determine conformance to 3.4.9, after relay has been temperature stabilized, maximum operating voltage shall be applied to coil terminals and current flow determined within 10 seconds after application of coil voltage.

4.6.10 Contact bounce and operating time test. To determine conformance to 3.4.10, measurements of relay closing times and contact bounce at 28 Vdc shall be taken. Time duration of contact bounce shall be taken from the average of 5 consecutive and individual measurements.

4.6.11 Inductive load test. To determine conformance to 3.4.11, after it has been temperature stabilized, relay shall be operated for 10,000 cycles in an inductive load circuit. Load circuit shall have a time constant $1/r$ (time required for the current to reach 63.2 percent of its steady-state value, found by dividing inductance in henries by resistance in ohms) of 0.026 seconds. Cycling time shall be as specified in 4.6.7. Subsequently, relay shall be tested as specified in 4.6.6.

4.6.12 Transient voltage characteristics test. To determine conformance to 3.4.12, relay shall be energized at maximum operating voltage. When relay is deenergized, voltage spike generated shall be measured with an oscilloscope.

4.6.13 Vibration test. To determine conformance to 3.4.13, relay shall be subjected to vibration test specified in method 514, procedure VIII, category f (curve W) of MIL-STD-810. One of the principal axes of vibration shall be

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along the line of contact movement. During each run, relay shall be energized at its normal resistive load rating for half of the time. Cycling shall be as specified in 4.6.8. During test, observation shall be made for any vibration-induced bounce of relay contacts. At conclusion of test, relay shall be inspected for evidence of damage. Relay shall then be tested as specified in 4.6.8, except that length of test shall be 100 cycles.

4.6.14 Waterproofness test. To determine conformance to 3.4.14, grade A relays shall be subjected to waterproofness test method 100, procedure 1 specified in MIL-STD-1184. Pretest data is required.

4.6.15 Shock test. To determine conformance to 3.4.15, relay shall be subjected to saw tooth shock test for ground equipment in method 516, procedure I, sawtooth pulse, of MIL-STD-810. Shock pulse shall be 40G with a duration of 11ms. One of the principal axes of shock pulses shall be along the line of contact movement. During each pulse, relay shall be energized with pickup voltage specified' in applicable drawing, and shall remain energized throughout test. Duration of contact bounce shall be observed and recorded. Care shall be taken to insulate recording device from shock. After test, specimen shall be examined for loose or broken parts. Thereafter, specimen shall be tested as specified in 4.6.10.

4.6.16 Corrosion resistance test. To determine conformance to 3.4.16, relay shall be subjected to salt fog test specified in method 509 of MIL-STD-810, except that duration of test shall be 200 hours. Immediately upon completion of test, relay shall be rinsed in lukewarm water, temperature stabilized, and tested as specified in 4.6.4, 4.6.5, and for 500 cycles as specified in 4.6.8.

4.6.17 Fungus resistance test. To determine conformance to 3.4.17, relay shall be subjected to fungus test specified in method 508 of MIL-STD-810, except that test duration shall be 90 days. Upon completion of test, relay shall be temperature stabilized and tested as specified in 4.6.4, 4.6.5, and for 500 cycles as specified in 4.6.8.

5. PACKAGING

5.1 Preservation, packaging, packing, and marking. Preservation, packaging, packing, and marking shall be in accordance with the applicable packaging standard or packaging data sheet specified by the acquisition activity (see 6.2).

6. NOTES

6.1 Intended use. Relays covered by this specification are intended for use as master relays, starter circuit relays. or control relays in tactical military vehicles.

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6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type and grade of relay (see 1.2).
- c. Applicable drawing number (see 3.3).
- d. Military part number (see 3.6).
- e. Selection of applicable level of preservation, packaging, packing, and marking document (see 5.1).

6.3 Definitions. Definitions of terminology used within shall be as specified in MIL-R-6106.

6.4 First article. First article samples shall be tested and approved under the appropriate provisions of 7-104.55 of the Defense Acquisition Regulation. The contracting officer should include specific instructions in all acquisition instruments regarding arrangements for examination, tests, and approval of the first article (see 3.1).

6.5 Recycled materials. The use of recycled materials which meet the requirements of the applicable material specifications without jeopardizing the intended use of the item shall be encouraged (see 3.2).

6.6 Changes from previous issue. Asterisks are not used in this revision, to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodian:
Army - AT

Preparing activity:
Army - AT

Review activities:
Army - ER, MI
DLA - SC

Project No. 2920-A387

User activities:
Army - ME
Navy - MC
Air Force - 99

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