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MILITARY STANDARD

RELAYS,
SELECTION AND APPLICATION OF

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DEPARTMENT OF DEFENSE
Washington, DC 20301

Relays, Selection and Application of

MIL-STD-1346C

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Electronics Supply Center, ATTN: DESC-ELD, 1507 Wilmington Pike, Dayton, OH 45444-5270, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FOREWORD

This standard describes selected standard relays for use in the design of military equipment.

Simply defined, a relay is an electrically operated switching device. A relay may be used to:

a. obtain isolation between the input circuit and the output circuit.

b. invert the signal sense (from open to closed and vice-versa).

c. increase the number of output circuits so as to switch more than one load or to switch loads from different sources.

d. repeat signals.

e. switch loads of different voltage or current ratings.

f. retain an input signal.

g. interlock circuits.

h. provide remote control.

Since misapplication is one of the major causes of relay failures, users are cautioned against using a relay in an application for which it is not rated. The application information and performance characteristics contained in this standard are offered for guidance and are not to be considered as mandatory. Users are advised to contact the Defense Electronics Supply Center (see 7.1) to verify the application of a relay to a particular design.

CONTENTS

1/ MIL-R-39016 covers relays with low level to 3 ampere load currents.
2/ MIL-R-83536 covers relays with 5 to 10 ampere load currents.

1. SCOPE

1.1 Scope. This standard is intended to be used as a quick-reference guide for selecting relays for use in military electronic equipment. Included in the data tables are standard relay types which have been reviewed and accepted jointly by the Departments of the Army, Navy, and Air Force.

1.2 Purpose. The purpose of this standard is to:

a. Provide the equipment designer with a selection of relays that are suitable for military applications.

b. Control and minimize the variety of relays used in military equipment in order to facilitate logistic support.

c. Present basic criteria pertinent to the choice, application, and use of relays in order to reduce misapplication failures.

2. REFERENCED DOCUMENTS

2.1 Government documents.

2.1.1 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 the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

MILITARY

MIL-R-5757 - Relays, Electromagnetic, General Specification for.

MIL-R-6106 - Relays, Electromagnetic, (Including Established Reliability Types) General Specification for.

MIL-R-28750 - Relays, Solid State, General Specification for.

MIL-R-28776 - Relays, Hybrid, Established Reliability, General Specification for.

MIL-R-39016 - Relays, Electromagnetic, Established Reliability, General Specification for.

MIL-R-83516 - Relays, Reed, Dry, General Specification for.

MIL-R-83536 - Relays, Electromagnetic, Established Reliability, General Specification for.

MIL-R-83725 - Relays, Vacuum, General Specification for.

MIL-R-83726 - Relays, Time Delay, Hybrid and Solid State, General Specification for.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Defense Printing Service Detachment Office, Bldg. 4D, (Customer Service), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 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.

AMERICAN NATIONAL STANDARDS INSTITUTE

ANSI C83.16 - Definitions and Terminology for Relays for Electronic Equipment.
ANSI Y32.3 - Graphic Symbols for Electrical and Electronics Diagrams.

(Application for copies should be addressed to the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.)

NATIONAL ASSOCIATION OF RELAY MANUFACTURERS

Engineer's Relay Handbook

(Application for copies should be addressed to the National Association of Relay Manufacturers, 9459 Broadmoor Road, Milwaukee, WI 53217.)

SOCIETY OF AUTOMOTIVE ENGINEERS

ARP 4005 - Selection and Application of Relays for Proper Performance.

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

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 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. DEFINITIONS

3.1 Terms. For a list of common terms used in the rating and design application of relays, refer to the Engineer's Relay Handbook. For relay definitions and terminology refer to ANSI C83.16. The following additional definition, from the Federal Item Name Directory (H-6) is also provided: Relay, solid state. A self-contained device that performs the function of opening or closing an electrical circuit in response to electrical changes in an external circuit. In lieu of separable contacts and their actuator(s), the switching function is accomplished by means of an arrangement of semiconductors and passive circuit devices. The device is designed to have electrical isolation between control circuit and output circuit.

3.2 Abbreviations. Abbreviation are used in several tables in this standard. These abbreviations are defined as follows:

a. LL: Low level. The contact rating of relays listed in this standard are based on load endurance tests which establish the relay's capability to switch rated loads. The low level range is 10 microamperes at 50 millivolts to 10 milliamperes at 6 volts dc or peak ac. All contact ratings are with the relay case grounded.

b. ER: Established reliability. A quantitive maximum failure rate demonstrated under controlled conditions as described in a military specification. The failure rate is usually expressed as percent failures per 1,000 hours of testing.

4. GENERAL REQUIREMENTS

4.1 Choice of relay types. The variety of relay types used in any particular design shall be the minimum necessary to obtain satisfactory performance using sound design practices. Where more than one type of relay may be suitable to a given application, consideration should be given to cost and availability. The relay types identified in this standard meet the criteria for standard types (see 4.3).

4.2 Conflict of requirements. In the event of conflict between the technical requirements of the relays described in this standard and the referenced military specification sheets, the latter shall govern.

4.3 Criteria for inclusion in this standard. The criteria for the inclusion of relays in this standard are as follows:

a. The relay shall be considered by representatives of the military departments as the best available type for current military applications.

b. The relay shall be in production, and continued availability shall be reasonably certain.

c. The relay shall be fully described in an approved military specification and shall be listed on a qualified products list.

4.4 Canceled, inactive, AN documents, and DESC drawings. Relays covered by canceled, inactive, AN (Army-Navy) specifications, or DESC drawings are not included in this standard.

5. DETAILED REQUIREMENTS

5.1 Detailed requirements. The tables in this standard list only the basic criteria for the selection of relays. Detailed requirements (case styles, dimensions, circuit diagrams, electrical and environmental data, quality assurance provisions, etc.) are contained in the latest issue of the referenced basic military specifications and specification sheets. Designers are advised to consult these documents for the most current technical information on the relays listed herein.

6. APPLICATION INFORMATION

6.1 General. Refer to SAE ARP 4005, sections 3, 4, 5, and 6, for application information.

MIL-R-5757

TABLE I. Relays, electromagnetic.

Spec sheet no.	Load current (A)	Contact configuration	Available coil voltage (rated)
1	LL to 2	6PDT	26.5 V dc
10	LL to 2	DPDT	6.0, 12.0, 26.5 V dc
13	2 (40 milliwatt)	DPDT	1/
15	5	4PDT	26.5 V dc, 115 V ac
16	5	6PDT	26.5 V dc, 115 V ac
18	10	4PDT	26.5 V dc, 115 V ac
23	10	DPDT	6.0, 12.0, 18.0, 26.5, 48.0, 120.0 V dc

1/ See MIL-R-5757/13 for these values.

MIL-R-6106

TABLE II. Relays, electromagnetic (including established reliability (ER) types).

Spec sheet or MS no.	Load current (A)	Contact config-uration	Avail coil voltage	Magnetic latch	Transient protection 1/	Aux contacts 1/	Track mount 1/	ER 1/	Hermetic seal 1/
1	LL to 10	2PDT	28 V dc, 115 V ac		X		X		X
2	10	4PDT	28 V dc, 115 V ac		X		X		X
8	10	6PDT	28 V dc, 115 V ac		X				X
9	60	3PDT	28 V dc, 115 V ac			X			environ-mentally sealed
10	60	3PST	28 V dc, 115 V ac		X	X			environ-mentally sealed
11	60	3PST	28 V dc, 115 V ac			X			environ-mentally sealed
12	LL and 2	1PDT	28 V dc	X		X			X
13	25	3PST	28 V dc, 115 V ac		X	X			X
14	50	SPDT (DB)	28 V dc		X	X			X
15	50	SPDT	28 V dc		X				X
19	25	SPDT	28 V dc		X				X
20	25	SPDT	28 V dc	X					X
21	5	2PDT	28 V dc		X		X	X	X
22	5	4PDT	28 V dc		X		X	X	X
24	10	3PDT	28 V dc		X		X	X	X

See footnote at end of table.

TABLE II. Relays, electromagnetic (including established reliability (ER) types) - Continued.

Spec sheet or MS no.	Load current (A)	Contact config-uration	Avail coil voltage	Magnetic latch	Transient protection 1/	Aux contacts 1/	Track mount 1/	ER 1/	Hermetic seal 1/
26	50	SPST	28 V dc		X	X			X
27	LL to 5	2PDT	28 V dc		X			X	X
28	LL to 5	4PDT	12 V dc, 28 V dc		X			X	X
29	LL to 10	3PDT	28 V dc		X			X	X
33	400	2PST	28 V dc			X			X
36	10	2PDT	28 V dc	X	X		X		X
37	10	4PDT	28 V dc	X	X		X		X
38	LL to 5	2PDT	28 V dc	X					X
39	LL to 5	4PDT	28 V dc	X					X
40	LL to 10	3PDT	28 V dc	X					X
41	25	3PNO	28 V dc, 115 V ac		X	X			X
42	135	3PDT	28 V dc		X	X			gasket sealed
43	65	1PNO	28 V dc		X				X
46	120	3PDT	30 V dc max	X	X	X			X
50	LL to 10	2PDT	28 V dc	X	X				X
51	LL to 10	4PDT	28 V dc, 115 V ac	X	X				X

See footnote at end of table.

TABLE II. Relays, electromagnetic (including established reliability (ER) types) - Continued.

MS number	Load current (A)	Contact config-uration	Avail coil voltage	Magnetic latch	Transient protection 1/	Aux contacts 1/	Track mount 1/	ER 1/	Hermetic seal 1/
24140	50	1PST	28 V dc			X			X
24141	100	1PST	28 V dc			X			X
24142	200	1PST	28 V dc			X			X
24143	25	3PST	28 V dc, 115 V ac			X			X
24149	10	2PDT	28 V dc, 115 V ac		X				X
24152	25	3PDT	28 V dc						
24166	50	1PST	28 V dc						
24168	100	3PST	28 V dc, 115 V ac			X			X
24171	200	1PST	28 V dc						
24172	200	1PST	28 V dc						
24179	400	1PST	28 V dc						
24182	100	1PST	28 V dc			X			X
24183	200	1PST	28 V dc			X			X
24184	300	1PST	28 V dc			X			X

See footnote at end of table.

TABLE II. Relays, electromagnetic (including established reliability (ER) types) - Continued.

MS number	Load current (A)	Contact config-uration	Avail coil voltage	Magnetic latch	Transient protection 1/	Aux contacts 1/	Track mount 1/	ER 1/	Hermetic seal 1/
24185	400	1PST	28 V dc						
24187	50/25	1PDT	28 V dc						
24192	25	3PST	28 V dc						
24193	50	3PST	28 V dc						
24376	50	3PST	28 V dc, 115 V ac			X			X
24568	10	4PDT	28 V dc, 115 V ac						X
25030	50	2PDT	28 V dc						
25031	100	2PDT	28 V dc						
25032	100	2PDT	28 V dc						
25267	5	4PDT	28 V dc, 115 V ac						X
25269	5	6PDT	28 V dc, 115 V ac						X
25271	10	4PDT	28 V dc, 115 V ac						X
25273	10	2PDT	28 V dc, 115 V ac						X
25395	5	2PDT	28 V dc, 115 V ac						X

See footnote at end of table.

TABLE II. Relays, electromagnetic (including established reliability (ER) types) - Continued.

MS number	Load current (A)	Contact config-uration	Avail coil voltage	Magnetic latch	Transient protection 1/	Aux contacts 1/	Track mount 1/	ER 1/	Hermetic seal 1/
25467	5	4PDT	28 V dc, 115 V ac	X					X
25468	10	4PDT	28 V dc, 115 V ac	X	X				X
25469	5	6PDT	28 V dc, 115 V ac	X	X				X
27222	50	3PST	28 V dc, 115 V ac		X	X			X
27242	100	1PST	28 V dc, 115 V ac			X			X
27400	10	4PDT	28 V dc, 48 V dc, 115 V ac		X			X	X
27401	10	2PDT	28 V dc, 115 V ac		X			X	X
27418	25	3PST	28 V dc, 115 V ac		X				X
27706	20	3PST	28 V dc						X
27714	75	3PST	28 V dc, 115 V ac			X			coil and contacts individually sealed
27715	150	3PST	28 V dc, 115 V ac			X			coil and contacts individually sealed
27742	25	3PDT	28 V dc	X					X
27743	25	3PDT	28 V dc, 115 V ac		X				X
27749	60	3PDT	28 V dc	X					X

See footnote at end of table.

TABLE II. Relays, electromagnetic (including established reliability (ER) types) - Continued.

MS number	Load current (A)	Contact config-uration	Avail coil voltage	Magnetic latch	Transient protection 1/	Aux contacts 1/	Track mount 1/	ER 1/	Hermetic seal 1/
27750	50	3PDT	28 V dc		X				X
27751	50 DC 60 AC	3PST 3PDT	28 V dc, 115 V ac		X	X			X
27997	25	3PST	28 V dc, 115 V ac			X			X

1/ An "X" in this column indicates that at least one relay covered by the appropriate specification or MS sheet has the characteristic indicated.

MIL-R-28750

TABLE III. Relays, solid state.

Spec sheet no.	Input current (mA) V dc max	Input voltage range (V dc)	Output current	Output voltage (rated)	Contact configuration	Hermetic seal
5	22 1/	4.0 - 7.0	1.0 - 25.0 mA	±40 V ac or dc	SPST	X
6	22 2/	4.0 - 7.0	10.0 - 200.0 mA	40 V dc	SPST	X
7	22 2/	4.0 - 7.0	10.0 - 40.0 mA	250 V dc	SPST	X
8	18	3.0 - 16.0	600 mA	50 V dc max	SPST	X
9	18	3.8 - 32.0	0 - 2 A	250 V ac rms, max, 40-440 Hz	SPST	X
10	16 max @ 32 V dc	4.0 - 32.0	25.0 A	220 V ac max, 45-440 Hz	SPST	

1/ At maximum turn-on voltage.
2/ At rated voltage.

MIL-R-28776

TABLE IV. Relay, hybrid, established reliability. 1/

Spec sheet no.	Load current (A)	Contact configuration	Avail supply voltage (rated) V dc	Sensitive coil	Internal MOSFET drive
1	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		
3	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 36.0, 48.0	X	
4	LL - 1.0	SPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 32.0, 40.0	X	
5	LL - 1.0	SPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		
6	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		X
7	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5	X	X

1/ All MIL-R-28776 relays have diode coil suppression.

TABLE V. Relay, electromagnetic, established reliability. 1/

Spec sheet	Load current (A)	Contact config-uration	Avail coil voltage (V dc)	Magnetic latch	Diode protection		Case style	Sensitive coil
					Transient coil suppression	Polarity reversal protection	H - half crystal can F - full crystal can T - TO-5 can	
6	LL - 2	DPDT	5.0, 6.0, 12.0, 26.5				H	
7	LL - 1	SPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5				T	
8	LL - 0.5	SPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5	X			T	
9	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 30.0				T	
10	LL - 1.0	SPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 32.0, 40.0				T	X
11	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 36.0, 48.0				T	X
12	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5	X			T	
13	LL - 2.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 36.0				H	
14	LL - 2.0	4PDT	6.0, 9.0, 12.0, 18.0, 22.0, 26.5, 36.0				F	

See footnote at end of table.

TABLE V. Relay, electromagnetic, established reliability - Continued. 1/

Spec sheet	Load current (A)	Contact config-uration	Avail coil voltage (V dc)	Magnetic latch	Diode protection		Case style	Sensitive coil
					Transient coil suppression	Polarity reversal protection	H - half crystal can F - full crystal can T - TO-5 can	
15	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		X		T	
16	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5 36.0, 48.0		X		T	
17	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5				T	
18	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		X		T	
19	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		X	X	T	
20	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		X	X	T	
21	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 36.0, 48.0		X	X	T	X
22	LL - 2.0	DPDT	6.0, 12.0, 26.5		X		H	
23	LL - 1.0	SPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		X		T	

See footnote at end of table.

TABLE V. Relay, electromagnetic, established reliability - Continued. 1/

Spec sheet	Load current (A)	Contact config-uration	Avail coil voltage (V dc)	Magnetic latch	Diode protection		Case style	Sensitive coil
					Transient coil suppression	Polarity reversal protection	H - half crystal can F - full crystal can T - TO-5 can	
24	LL - 1.0	SPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		X	X	T	
25	LL - 1.0	SPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 32.0, 40.0		X		T	X
26	LL - 1.0	SPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 32.0, 40.0		X	X	T	X
27	LL - 0.5	SPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5	X	X		T	
28	LL - 0.5	SPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5	X	X	X	T	
29	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5	X	X		T	
30	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5	X	X	X	T	
31	LL - 2.0	4PDT	6.0, 12.0, 26.5	X			F	
32	LL - 2.0	DPDT	6.0, 12.0, 26.5	X			H	

See footnote at end of table.

TABLE V. Relay, electromagnetic, established reliability - Continued. 1/

Spec sheet	Load current (A)	Contact config-uration	Avail coil voltage (V dc)	Magnetic latch	Diode protection		Case style	Sensitive coil
					Transient coil suppression	Polarity reversal protection	H - half crystal can F - full crystal can T - TO-5 can	
33	LL - 2.0	SPDT, DPDT	6.0, 12.0, 26.5				H	
35	LL - 2.0	4DPT	6.0, 12.0, 26.5	X	X		F	
36	LL - 2.0	4DPT	6.0, 12.0, 26.5	X	X	X	F	
37	LL - 2.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		X		H	
38	LL - 2.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		X	X	H	
39	LL - 3.0	4DPT	6.0, 12.0, 26.5				H	
41	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 36.0, 48.0				T	X
42	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 36.0, 48.0		X		T	X
43	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5, 36.0, 48.0		X	X	T	X
44	LL - 2.0	DPDT	5.0, 6.0, 12.0, 26.5, 30.0, 36.0				H	X

See footnote at end of table.

TABLE V. Relay, electromagnetic, established reliability - Continued. 1/

Spec sheet	Load current (A)	Contact config-uration	Avail coil voltage (V dc)	Magnetic latch	Diode protection		Case style	Sensitive coil
					Transient coil suppression	Polarity reversal protection	H - half crystal can F - full crystal can T - TO-5 can	
45	LL - 2.0	DPDT	5.0, 6.0, 12.0, 26.5, 48.0	X			H	
47	LL - 0.5	DPDT	5.0, 12.0, 24.0	X			H	X
48	LL - 0.5	DPDT	5.0, 12.0, 26.5				H	X
49	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5				T	
50	LL - 1.0	DPDT	5.0, 6.0, 9.0, 12.0, 18.0, 26.5		X		T	
53	LL - 2.0	4DPT	6.0, 9.0, 12.0, 18.0, 22.0, 26.5, 36.0		X		F	
55	LL - 2.0	DPDT	5.0, 6.0, 12.0, 26.5		X		H	

1/ All MIL-R-39016 relays are hermetically sealed.

MIL-R-83516

TABLE VI. Relay, reed, dry.

Spec sheet no.	Load current (mA max)	Contact arrangement	Avail coil voltage (V dc)	Transient protection 1/	Package style		Low power coil
					SIP	DIP	
1	250 and 500	SPST, SPDT, DPST	5.0, 12.0, 24.0	X		X	
3	500	SPST	5.0, 12.0, 24.0	X	X		
4	250 and 500	SPST, SPDT	5.0	X		X	X
5	500	SPST	5.0, 12.0	X	X		X

1/ An "X" in this column indicates that at least one relay on the associated specification sheet has transient coil protection.

MIL-R-83536

TABLE VII. Relays, electromagnetic, established reliability. 1/

Spec sheet or MS no.	Load current (A)	Contact config-uration	Avail coil voltage	Magnetic latch	Diode protection		Track mount
					Transient coil suppression	Polarity reversal protection	
1	LL - 5.0	DPDT	6.0, 12.0, 28.0, 48.0 V dc				
2	LL - 5.0	DPDT	6.0, 12.0, 28.0, 48.0 V dc		X		X
3	LL - 5.0	DPDT	6.0, 12.0, 28.0, 48.0 V dc	X			
4	LL - 5.0	DPDT	6.0, 12.0, 28.0, 48.0 V dc	X	X		
5	LL - 5.0	4PDT	6.0, 12.0, 28.0, 48.0 V dc				
6	LL - 5.0	4PDT	6.0, 12.0, 28.0, 48.0 V dc		X		X
7	LL - 5.0	4PDT	6.0, 12.0, 28.0, 48.0 V dc	X			
8	LL - 5.0	4PDT	6.0, 12.0, 28.0, 48.0 V dc	X	X		
9	LL - 10.0	DPDT	6.0, 12.0, 28.0, 48.0 V dc				
10	LL - 10.0	DPDT	6.0, 12.0, 28.0, 48.0 V dc		X		X
11	LL - 10.0	DPDT	115 V ac				
12	LL - 10.0	DPDT	6.0, 12.0, 28.0, 48.0 V dc	X			

See footnote at end of table.

TABLE VII. Relays, electromagnetic, established reliability - Continued. 1/

Spec sheet or MS no.	Load current (A)	Contact config-uration	Avail coil voltage	Magnetic latch	Diode protection		Track mount
					Transient coil suppression	Polarity reversal protection	
13	LL - 10.0	DPDT	6.0, 12.0, 28.0, 48.0 V dc	X	X	X	X
14	LL - 10.0	DPDT	115 V ac	X			
15	LL - 10.0	4PDT	6.0, 12.0, 28.0, 48.0 V dc				
16	LL - 10.0	4PDT	6.0, 12.0, 28.0, 48.0 V dc		X		X
17	LL - 10.0	4PDT	115 V ac				X
18	LL - 10.0	4PDT	6.0, 12.0, 28.0, 48.0 V dc	X			
19	LL - 10.0	4PDT	6.0, 12.0, 28.0, 48.0 V dc	X	X	X	X
20	LL - 10.0	4PDT	115 V ac	X			
21	LL - 10.0	3PDT	6.0, 12.0, 28.0, 48.0 V dc				
22	LL - 10.0	3PDT	6.0, 12.0, 28.0, 48.0 V dc		X		X
23	LL - 10.0	3PDT	6.0, 12.0, 28.0, 48.0 V dc	X			

See footnote at end of table.

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TABLE VII. Relays, electromagnetic, established reliability - Continued. 1/

Spec sheet or MS no.	Load current (A)	Contact config-uration	Avail coil voltage	Magnetic latch	Diode protection		Track mount
					Transient coil suppression	Polarity reversal protection	
24	LL - 10.0	3PDT	6.0, 12.0, 28.0, 48.0 V dc	X	X		
25	LL - 10.0	6PDT	28.0 V dc				
26	LL - 10.0	6PDT	28.0 V dc		X		
27	LL - 10.0	6PDT	115 V ac				
28	LL - 10.0	DPDT	6.0, 12.0, 18.0, 28.0, 48.0, 120.0 V dc				
29	LL - 10.0	DPDT	6.0, 12.0, 18.0, 28.0, 48.0, 120.0 V dc		X	X	
30	LL - 10.0	DPDT	6.0, 12.0, 18.0, 28.0, 48.0, 120.0 V dc				
31	LL - 10.0	DPDT	6.0, 12.0, 18.0, 28.0, 48.0, 120.0 V dc		X	X	

1/ All MIL-R-83536 relays are hermetically sealed.

TABLE VIII. Relay, vacuum.

Spec sheet no.	Load current (A)	Contact configuration	Avail coil voltage (V dc)	Magnetic latch	Contact voltage rating (KV peak) (dc)
1	15.0 rms	SPDT	26.5		12.0
2	25.0 rms	SPDT	26.5, 115.0		25.0
3	8.0 dc	SPDT	26.5		2.0
4	3.0 dc	SPDT	15.0, 26.5		2.5
5	18.0 rms	SPDT	26.5		3.5
6	12.0 dc or 60 Hz rms	SPST	26.5	X	3.6 or 60 Hz
7	12.0 dc or 60 Hz rms	SPST 1/	26.5		3.6
8	12.0 dc or 60 Hz rms	SPST 2/	26.5		3.6
9	12.0 dc or 60 Hz rms	SPST	26.5	X	7.0
10	12.0 dc or 60 Hz rms	SPST	12.0, 26.5		10.0 or 60 Hz
11	12.0 dc or 60 Hz rms	SPDT	26.5	X	3.6 or 60 Hz
12	12.0 dc or 60 Hz rms	SPDT	12.0, 26.5		3.6
13	12.0 dc or 60 Hz rms	SPDT	26.5	X	9.0 or 60 Hz
15	75.0 rms	SPDT	6.0, 12.0, 26.5, 48.0, 115.0		15.0

See footnotes at end of table.

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TABLE VIII. Relay, vacuum - Continued.

Spec sheet no.	Load current (A)	Contact configuration	Avail coil voltage (V dc)	Magnetic latch	Contact voltage rating (KV peak) (dc)
16	12.0 dc or 60 Hz rms	SPDT	12.0, 26.5		9.0 or 60 Hz
17	12.0 dc or 60 Hz rms	SPST	12.0, 26.5		10.0
18	8.0 dc	SPST	26.5		5.0, 30 MHz; 7.0, 16 MHz; 7.5, 2.5 MHz; 7.5, 60 Hz
21	15.0 dc or 60 Hz rms	SPST 2/	12.0, 26.5, 115.0		5.0
22	15.0 dc or 60 Hz rms	SPST 1/	12.0, 26.5, 115.0		5.0
23	15.0 dc or 60 Hz rms	SPDT	12.0, 26.5, 115.0		5.0
24	15.0 dc or 60 Hz rms	SPST	26.5	X	5.0

1/ Contacts are normally closed (N/C).
2/ Contacts are normally open (N/O).

TABLE IX. Relays, hybrid and solid state, time delay.

Spec sheet no.	Load current	Contact arrangement	Input voltage (V dc)	Time delay				Time delay (sec) ±10%	Track mount	Hybrid	Solid state
				On operate	On release	Fixed time	Various time				
13	300 mA	SPST	28.0	X		X		.05 to 600			X
18	10.0 A	2PDT	28.0		X	X		.1 to 300	X	X	
19	10.0 A	2PDT	28.0	X		X		.1 to 300	X	X	
20	250 mA	SPST	28.0	X		X		.05 to 500			X
21	250 mA	SPST	28.0	X			X	.05 to 500			X
24	150 mA	SPST	28.0	X		X		.05 to 500	X		X
25	150 mA	SPST	28.0		X	X		.05 to 500	X		X
28	10.0 A	DPDT	20.0 to 30.0	X		X		.1 to 500		X	
29	10.0 A	DPDT	20.0 to 30.0		X	X		.1 to 500		X	
30	10.0 A	DPDT	20.0 to 30.0	X			X	.1 to 500		X	
31	10.0 A	DPDT	20.0 to 30.0		X		X	.1 to 500		X	

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