

INCH-POUND

MIL-PRF-83536/17A
14 November 1997
SUPERSEDING
MIL-R-83536/17
27 March 1992

PERFORMANCE SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, 4PDT, LOW LEVEL
TO 10 AMPERES, PERMANENT MAGNET DRIVE, HERMETICALLY SEALED,
ALL WELDED, AC COILS

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

The requirements for acquiring the product described herein shall consist
of this specification sheet and MIL-PRF-83536.

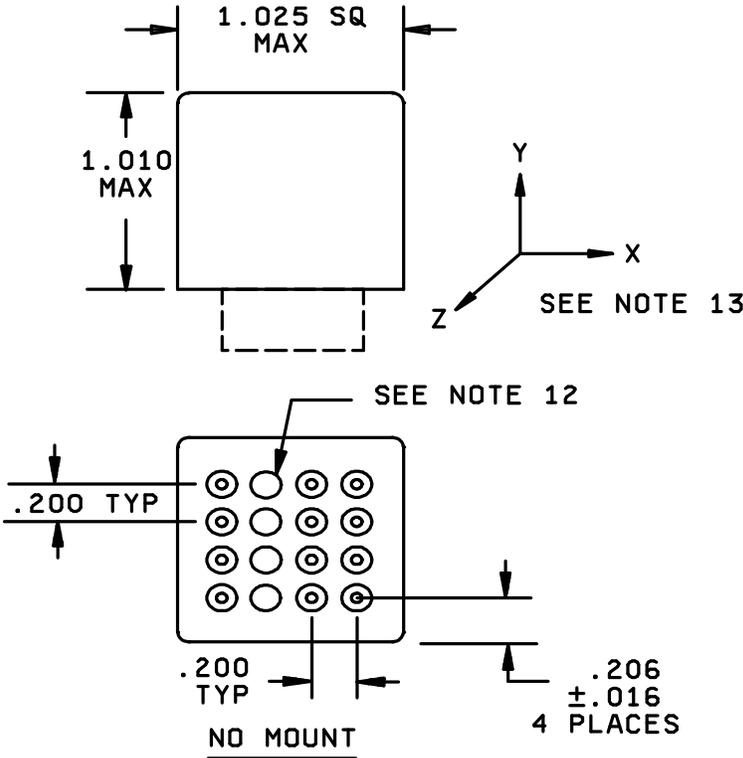
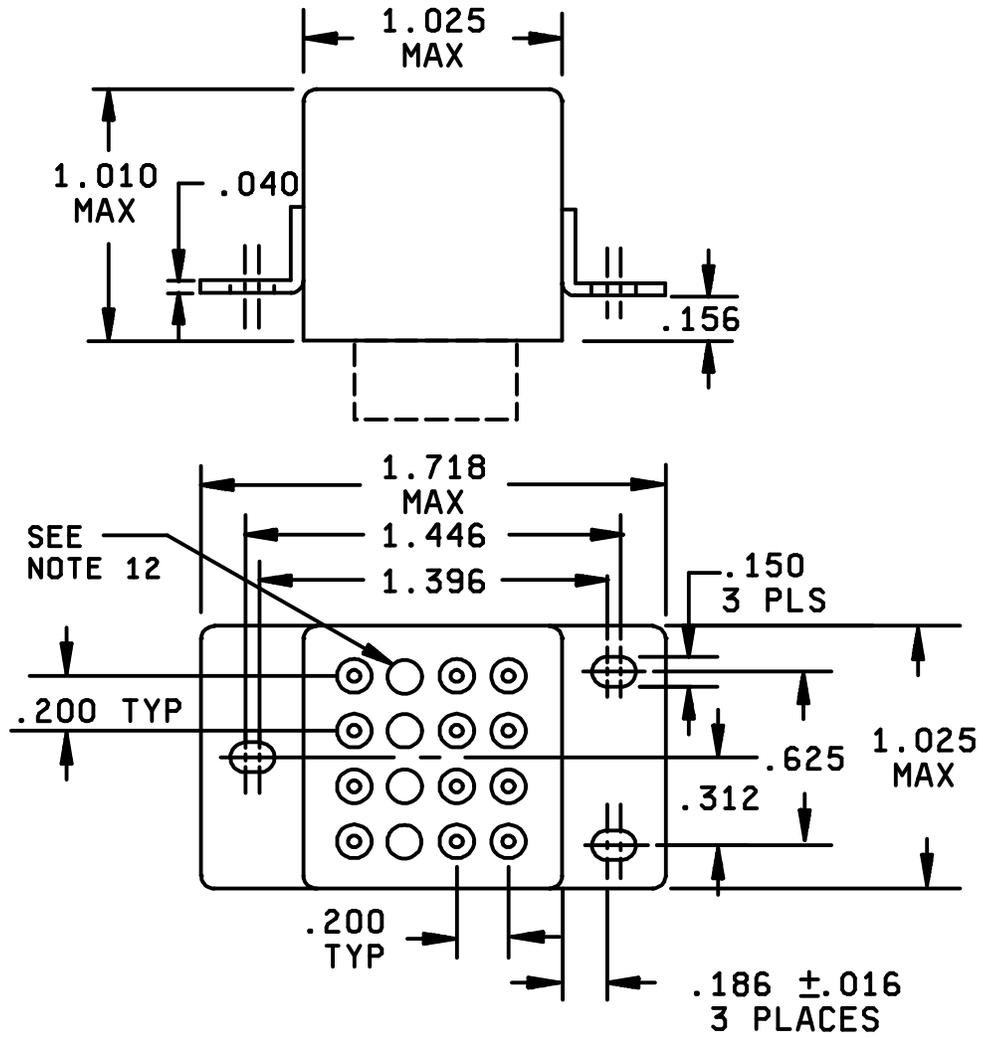


FIGURE 1. Dimensions and configurations.



RAISED VERTICAL FLANGE MOUNT (RVFM)

FIGURE 1. Dimensions and configurations - Continued.

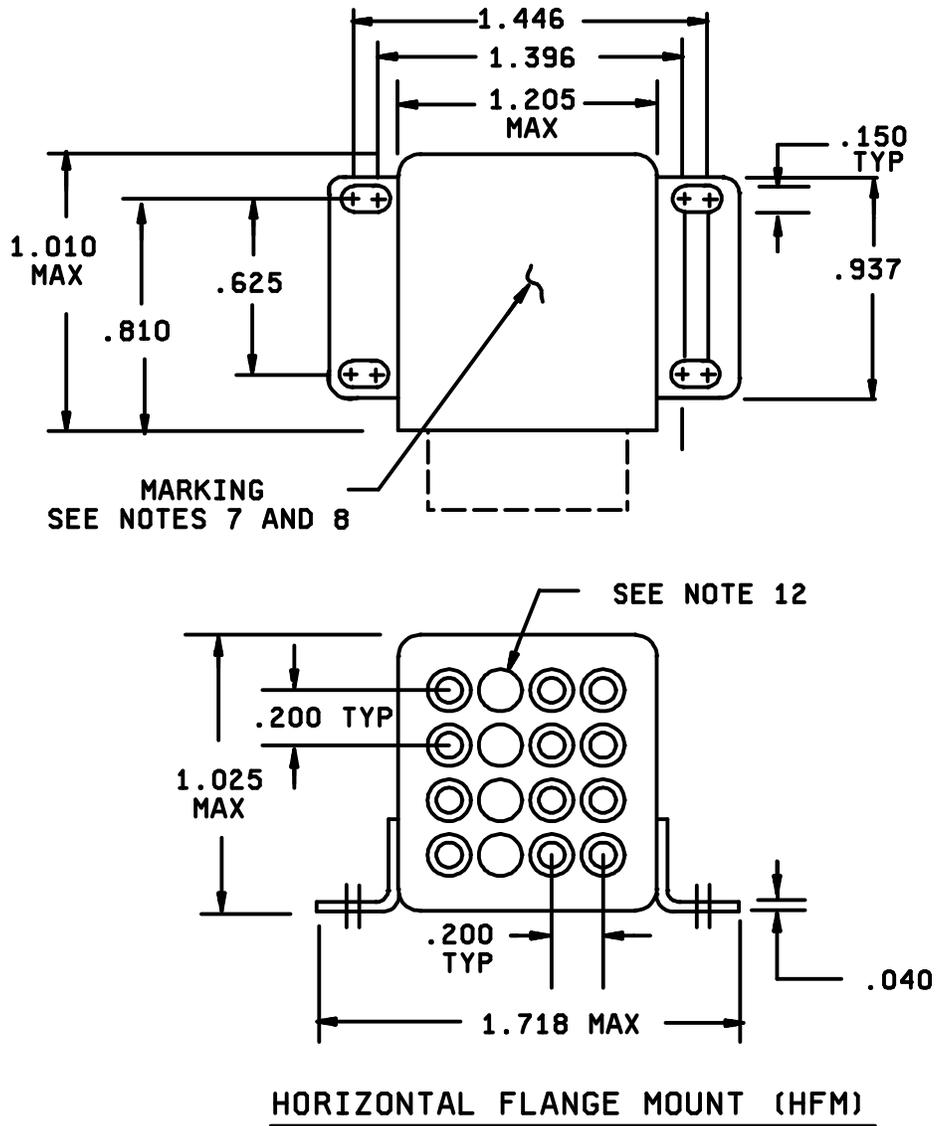


FIGURE 1. Dimensions and configurations - Continued.

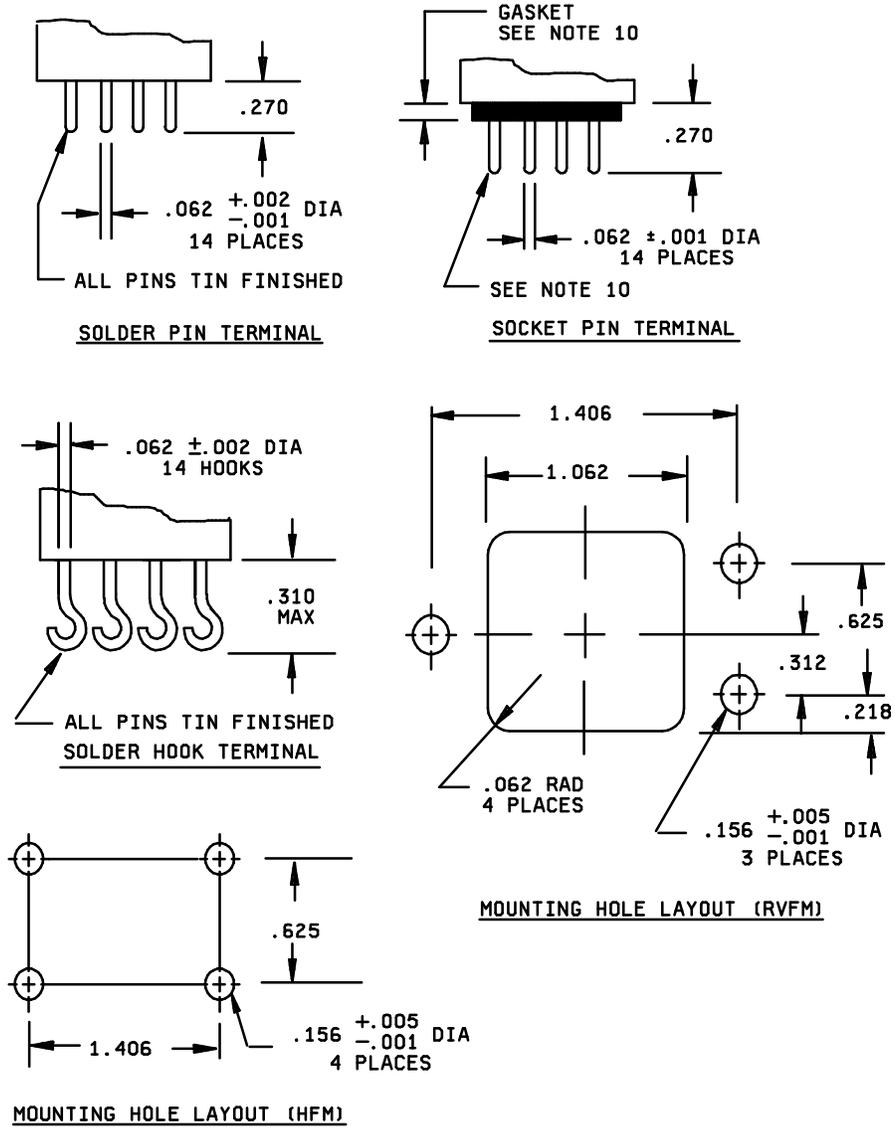


FIGURE 1. Dimensions and configurations - Continued.

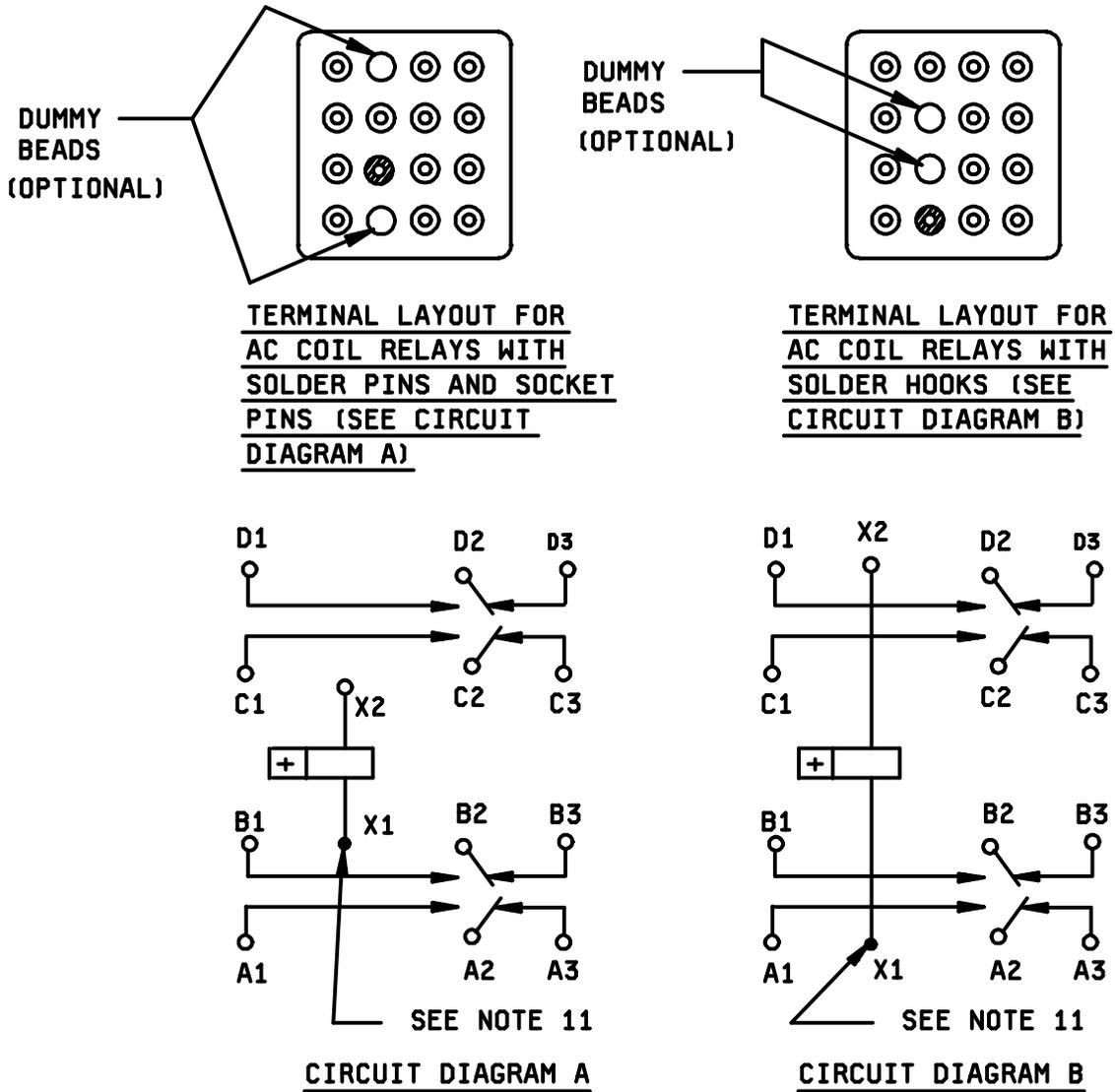


FIGURE 1. Dimensions and configurations - Continued.

MIL-PRF-83536/17A

<u>Inches</u>	<u>mm</u>	<u>Inches</u>	<u>mm</u>	<u>Inches</u>	<u>mm</u>
.001	0.03	.172	4.37	.937	23.80
.002	0.05	.200	5.08	1.010	25.65
.005	0.13	.218	5.54	1.025	26.04
.040	1.02	.270	6.86	1.062	26.97
.050	1.27	.310	7.87	1.396	35.46
.062	1.57	.312	7.92	1.406	35.71
.150	3.81	.625	15.88	1.446	36.73
.156	3.96	.810	20.57	1.718	43.64

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is ± 0.010 (0.25 mm).
4. There shall be affixed to the relay a suitable legible circuit diagram that identifies each terminal location specified.
5. These relays are polarized monostable.
6. Permanent magnet drive consists of a permanent magnet with its flux path switched and combined with the electromagnet flux.
7. Applicable to horizontal flange mount only. The circuit diagram, manufacturer's PIN, and the military PIN shall be marked on the near side. The remaining portion of the nameplate data shall be marked on the far side.
8. Applicable to horizontal flange mount only. Relays shall be marked with the manufacturer's name or CAGE code and date code. Marking shall be with the bottom of the print adjacent to the near side.
9. Socket pin terminals shall be gold-plated in accordance with MIL-G-45204, type II, class I. The nickel underplating shall be 50 to 150 microinches thick.
10. Silicone rubber gasket, AMS 3332, shore hardness 15 to 35, thickness $.050 \pm .005$ (1.27 \pm 0.13 mm).
11. Indicated terminals shall be identified by contrasting beads.
12. For coil pin orientation, see figure 1.
13. Plane of critical motion for vibration and shock is Y-axis.

FIGURE 1. Dimensions and configurations - Continued.

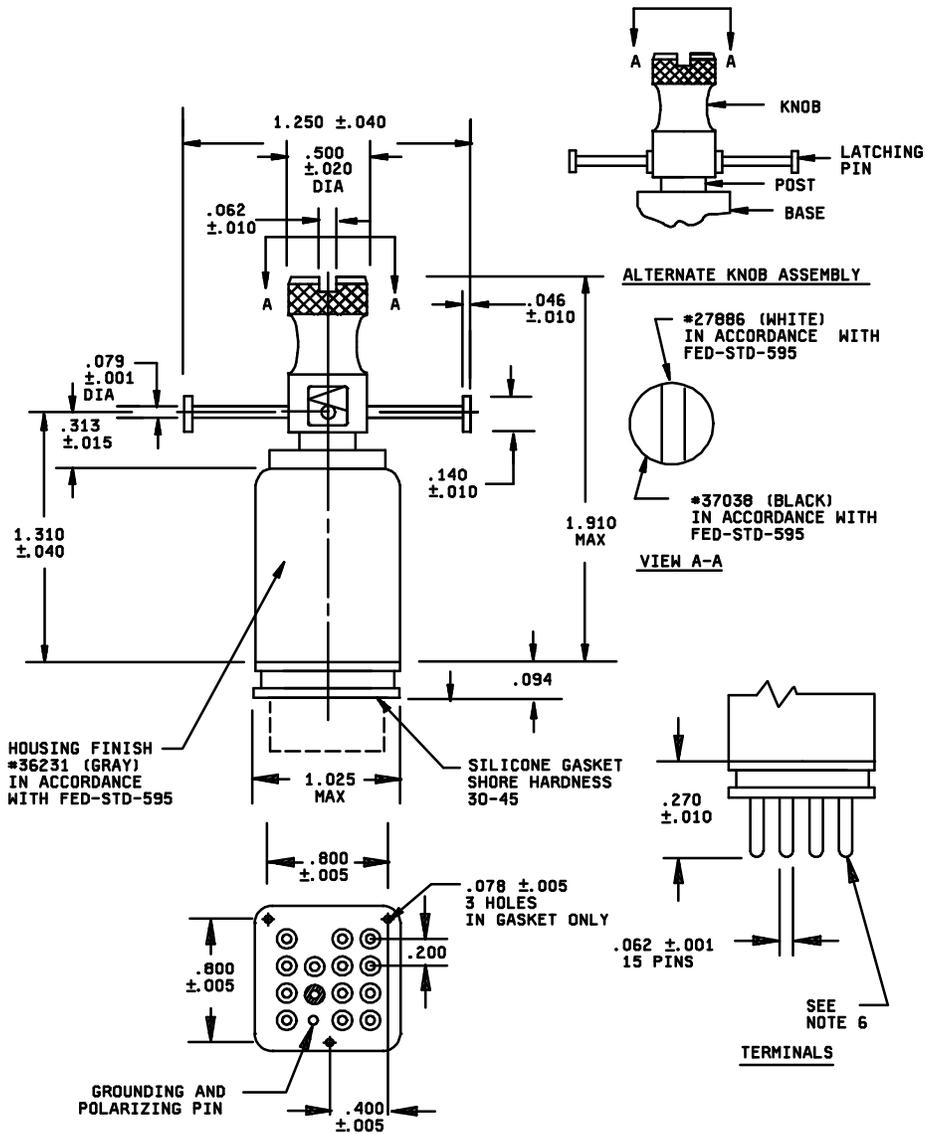
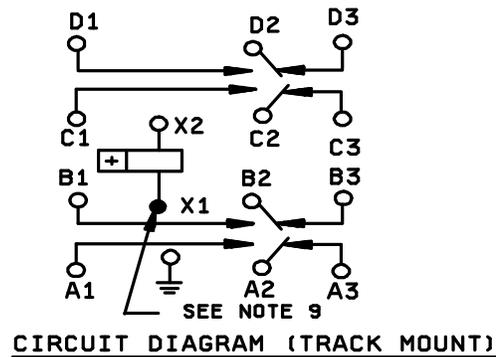


FIGURE 2. Outline dimensions and configuration, track mount (see notes 7 and 8).



<u>Inches</u>	<u>mm</u>	<u>Inches</u>	<u>mm</u>
.001	0.03	.140	3.56
.005	0.13	.200	5.08
.010	0.25	.270	6.86
.015	0.38	.313	7.95
.020	0.51	.400	10.16
.040	1.02	.500	12.70
.046	1.17	.800	26.32
.062	1.57	1.025	26.04
.078	1.98	1.250	31.75
.079	2.01	1.310	33.27
.094	2.39	1.910	48.51

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is $\pm .010$ (0.25 mm).
4. Permanent magnet drive consists of a permanent magnet with its flux path switched and combined with the electromagnetic flux.
5. Terminal numbers shall not appear on the header. There shall be affixed to the relay a suitable legible circuit diagram that identifies each terminal location specified.
6. All terminals shall be gold plated in accordance with MIL-G-45204, type II, class I; underplating shall be nickel, 50 to 150 microinches thick.
7. Track mount knob, post, and base shall be 303 Cres nickel plated in accordance with McAir P.S. 13112 or equivalent, 100 microinches thick minimum. The latching pin shall be 303 Cres passivated or nickel plated in accordance with McAir P.S. 13112 or equivalent, 100 microinches thick minimum.
8. Track mount relay shall be capable of mating with M6106/4 "Bracket and Socket Assembly", configuration III. The latching pin shall be capable of withstanding an axial pull of 35 pounds, in a direction away from the knob, without any degradation. The rotation of the knob mechanism shall be restricted such that the latching pins cannot be placed on the side opposite the M6106/4 bracket cutouts.
9. Indicated terminals shall be identified by a contrasting bead.

FIGURE 2. Outline dimensions and configuration, track mount (see notes 7 and 8) - Continued.

MIL-PRF-83536/17A

REQUIREMENTS:

Contact data:

Load ratings: See table I.

Low level: 10 to 50 μ A at 10 to 50 mV dc or peak ac.

Intermediate current: Applicable.

Mixed loads: Applicable.

TABLE I. Rated contact load and cycles (amperes per pole).

Type of load (high level)	Cycles x 10 ³	28 V dc	115 V ac 1 phase 400 Hz	115 V ac 1 phase 50/60 Hz <u>1/</u>	115/200 V ac 3 phase 400 Hz	115/200 V ac 3 phase 50/60 Hz <u>1/</u>
Resistive	100	10	10	2.5	10	2.5
Inductive	20	8	8	N/A	8	N/A
Inductive	10	N/A	N/A	2.5	N/A	2.5
Motor	100	4	4	2	4	2
Lamp	100	2	2	1	N/A	N/A

1/ For 50/60 Hz rating, rupture and overload are not applicable and life for each load shall be 10,000 cycles.

Life: 100,000 cycles, unless otherwise specified (see table I).

Contact voltage drop and resistance:

Initial contact voltage drop: 0.100 volt maximum. Rated resistive current at 6 V dc or peak ac. Relays shall not make or break this load.

Initial contact resistance: 0.010 ohm maximum. 50 mA max at 6 V dc or peak ac.

High level life (contact voltage drop):

During life: 10 percent open circuit voltage maximum.

After life: 0.125 volt maximum.

Intermediate current (contact resistance):

During intermediate current: 3 ohms maximum.

After intermediate current: 0.150 ohm maximum.

Low level (contact resistance):

During low level: 100 ohms maximum.

After low level: 0.150 ohm maximum at 100 mA and 28 V dc.

MIL-PRF-83536/17A

Contact bounce: 1.0 millisecond maximum.

Contact stabilization time: 2.5 milliseconds maximum.

Overload current: 40 amperes dc (60 amperes ac).

Rupture current: 50 amperes dc, 80 amperes ac.

Time current relay characteristics: See table II.

TABLE II. Time current relay characteristics. 1/

Successive application	Amperes	Time
1	15	1 hour
2	50	5.0 seconds
3	100	1.2 seconds
4	250	0.2 second
5	350	0.1 second

1/ All relays shall withstand overload and fault currents. Relays must be able to sustain five applications (make and carry only) of power concurrently on adjacent poles at each of five different current levels in the sequence listed in table II. Separate relays shall be tested at 28 V dc and 115/200 V ac, 400 Hz 3-phase. Cooling time between successive applications shall be 30 minutes. Tests shall be performed on both normally open and normally closed contacts. There shall be no failures or evidence of welding or sticking and relays shall pass contact voltage drop at the conclusion.

Coil data 1/ 2/: See table III.

Operate time: 20 milliseconds maximum, 15 milliseconds maximum (track mount) with rated coil voltage over the temperature range.

Release time: 50 milliseconds maximum from rated coil voltage over the temperature range.

Duty rating: Continuous.

Coil transient suppression: Not applicable.

Neutral screen: Not applicable.

1/ CAUTION: Due to possible interaction of relay magnetic fields, the following spacing requirements, as a minimum, shall be considered in dense packaging situations:

- a. Row to row assisting fields: .125 (3.18 mm).
- b. Row to row opposing fields: .188 (4.78 mm).
- c. Side to side alternating fields: .062 (1.57 mm).
- d. Side to side like fields: .125 (3.18 mm).

2/ Track mount relays shall have the pickup, hold, and dropout voltage, and timing tests, performed with a MIL-PRF-12883/51 bracket placed around the relay housing.

TABLE III. Dash numbers and characteristics. 1/

Dash number 2/		Coil data														
Solder pin	Solder hook	Socket pin	Mount	At 25°C						Over temperature range			Maximum pickup voltage			
				Coil voltage (V ac) 3/	Frequency (Hz)	Coil current amps (max)	Specified pickup voltage (V ac) 4/	Specified hold voltage (V ac) 4/	Specified dropout voltage (V ac) 4/	Specified pickup voltage (V ac) 4/	Specified hold voltage (V ac) 4/	Specified dropout test (V ac) 4/	High temperature test	Continuous current		
				Rated	Max											
	001	002	RVFM	115	122	400	.04	73	24	7	90	30	5	95.4	105	
003	004	005	RVFM	115	122	50/400	.04	73	30	7	90	40	5	95.4	105	
	006		HFM	115	122	400	.04	73	24	7	90	30	5	95.4	105	
	007		HFM	115	122	50/400	.04	73	30	7	90	40	5	95.4	105	
008	009		No mount	115	122	50/400	.04	73	30	7	90	40	5	95.4	105	
		010	Track	115	122	400	.04	73	24	7	90	30	5	95.4	105	

- 1/ Each relay possesses high level and low level capabilities. However, relays previously tested or used above 10 mA resistive at 6 V dc maximum or peak ac open circuits are not recommended for subsequent use in low level applications.
- 2/ The suffix letter L, M, P, or R to designate the applicable failure rate level shall be added to the applicable listed dash number. Failure rate level (percent per 10,000 cycles): L, 3.0; M, 1.0; P, 0.1; R, 0.01. Example: 001L, 002R.
- 3/ CAUTION: The use of any coil voltages less than the rated coil voltage will compromise the operation of the relay.
- 4/ Pickup, hold, and dropout voltages as shown are for test purposes only and are not to be used for design criteria.

MIL-PRF-83536/17A

Electrical data:

Insulation resistance:

Initial: 100 megohms minimum at 500 V dc.

After life or environmental tests: 100 megohms minimum at 500 V dc (track mount), 50 megohms minimum at 500 V dc (all others).

Dielectric withstanding voltage 3:

	Track mount		All others	
	Coil to case	All other points	Coil to case	All other points
Sea level:				
Initial	1050	1500	1000	1250
After life:	1050	1250	1000	1000
Altitude:				
At 80,000 feet	350	350	350	350
At 300,000 feet	---	---	500	500

Maximum leakage current (track mount only): 100 microamperes rms.

Environmental characteristics:

Temperature range: -70°C to +125°C.

Maximum altitude rating: 300,000 feet, 80,000 feet for track mount.

Shock (specified pulse): Applicable, MIL-STD-202, method 213, test condition C, 200 g's for 6 ±1 ms, except horizontal flange mount peak g value shall be 100 g's for 6 ±1 ms. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

Vibration (sinusoidal): Applicable, MIL-STD-202, method 204, 30 g's except frequency range shall be 10 to 3,000 Hz. Horizontal flange mount shall be 20 g's, 57 to 3,000 Hz. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

Vibration (random): Applicable to qualification and group C inspection. Test in accordance with MIL-STD-202, method 214, test condition IG (0.4 g²/Hz, 50 to 2000 Hz); for horizontal flange mount test condition IE (0.2 g²/Hz). Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

3/ Dielectric may be improved by suitable insulation of terminals and wiring after installation.

MIL-PRF-83536/17A

Vibration (random): Applicable to track mount only. Applicable to qualification only. Test in accordance with MIL-STD-202, method 214, test condition IG, 1.5 hours per axis. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

Acceleration: Applicable, except 15 g's.

Physical data:

Dimensions and configurations: See figure 1.

Weight: 0.17 pound (77 grams), 0.20 pound (90.6 grams).

Terminal strength:

Solder hook terminals:

Pull force: 10 pounds \pm 1.0 pound.

Bend: Not applicable to leads .047 (1.19 mm) and larger.

Twist: Not applicable.

Solder pin terminals:

Pull force: For .062 diameter terminals: 10 pounds \pm 1.0 pound.

Bend: Not applicable to leads .047 (1.19 mm) and larger.

Twist: Not applicable.

Socket pin terminals:

Pull force: For .062 diameter terminals: 10 pounds \pm 1.0 pound.

Bend: Not applicable to leads .047 (1.19 mm) and larger.

Twist: Not applicable.

Terminal solderability: Applicable to solder pin and solder hook terminals only.

Seal: Hermetic.

Marking: Applicable.

Part or Identifying Number (PIN): M83536/17 (dash number from table III and suffix letter designating failure rate level).

MIL-PRF-83536/17A

Qualification inspection:

Qualification inspection and sample size: See table IV.

TABLE IV. Qualification inspection and sample size ^{1/}.

Single submission	Group submission	
18 units plus 1 open unit for level L at C = 0	M83536/17-005	18 units plus 1 open unit for level L at C = 0
33 units plus 1 open unit for level M at C = 0	"	33 units plus 1 open unit for level M at C = 0
Qualification inspection as applicable	"	Qualification inspection as applicable
	M83536/17-002	2 units, qualification inspection table,
	M83536/17-004	group II, shock, vibration, acceleration, terminal strength, and seal
	M83536/17-006	2 units, qualification inspection table, group II
	M83536/17-010	
	M83536/17-009	

^{1/} The number of units required for qualification testing shall be increased as required in group V, table II of MIL-PRF-83536, if the contractor elects to test the number of units permitting one or more failures. Prior to performance of qualification testing, the relay manufacturer shall preselect the sampling plan.

Supersession data: See table V.

TABLE V. Supersession data.

Superseded PIN	Replacement PIN M83536/17-
MS27400- 7	001
8	002
11	001
12	002
20	006
22	006
26	004
27	007
28	005
32	004
33	007
34	005
39	003
48	009
49	008
50	009
51	008
M6106/2- 002	010

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

Custodians:
Army - CR
Navy - EC
Air Force - 85

Review activities:
Air Force - 99
DLA - CC

Preparing activity:
Air Force - 85

Agent:
DLA - CC

(Project 5945-0993-09)