

INCH-POUND  
MIL-PRF-83536/11B  
15 July 2002  
SUPERSEDING  
MIL-PRF-83536/11A  
12 October 2000

PERFORMANCE SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, DPDT,  
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.

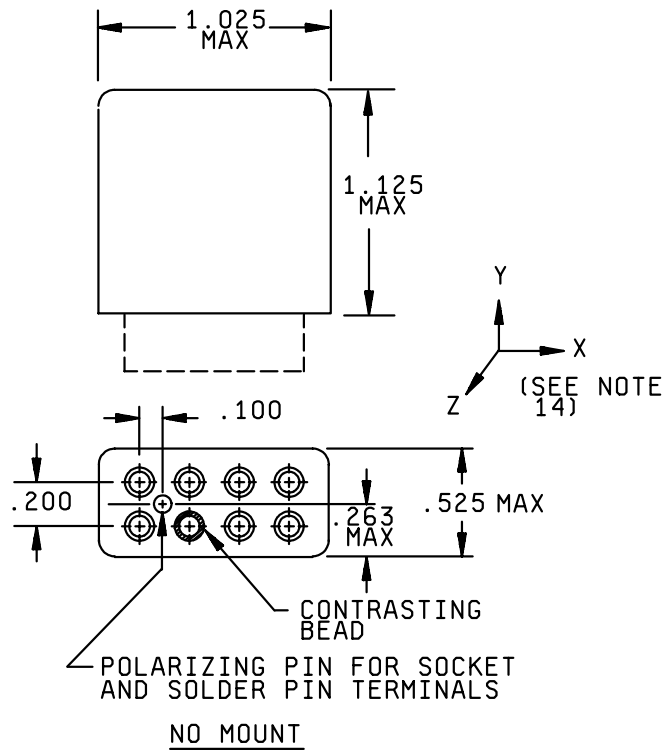
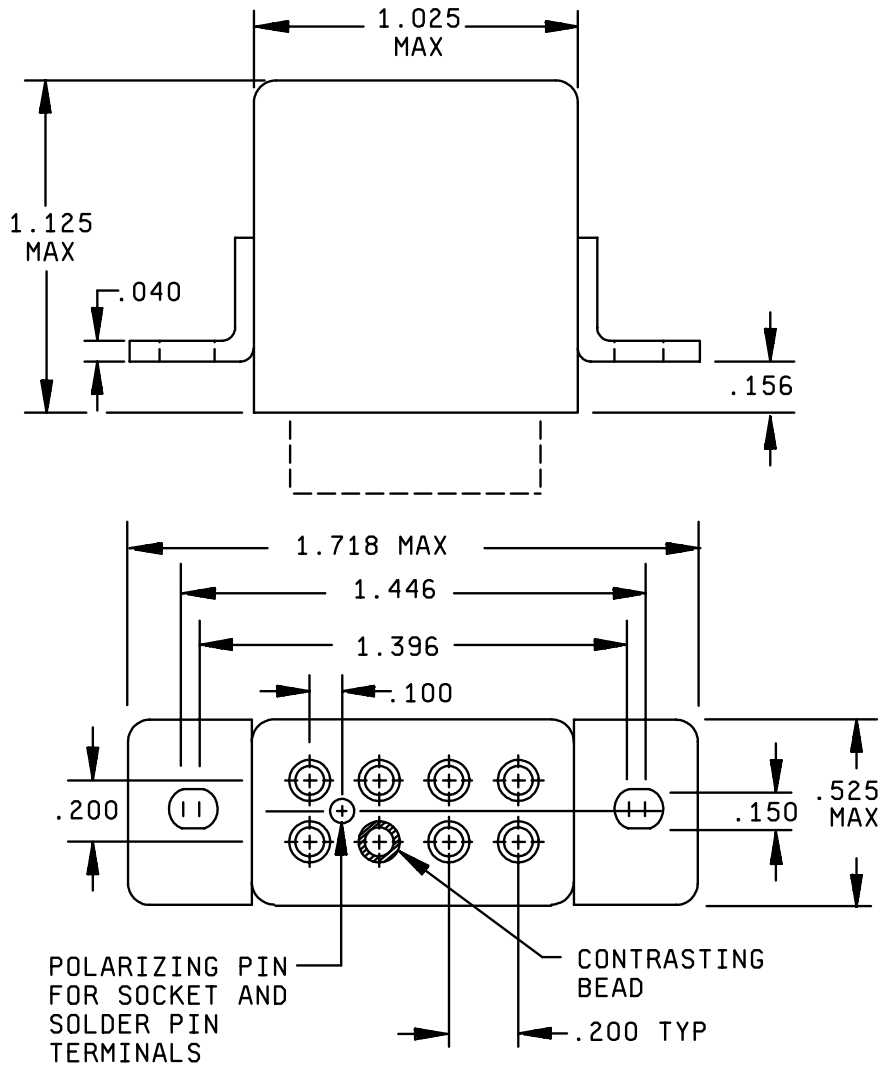


FIGURE 1. Dimensions and configurations.



RAISED VERTICAL FLANGE MOUNT (RVFM)

FIGURE 1. Dimensions and configurations - Continued.

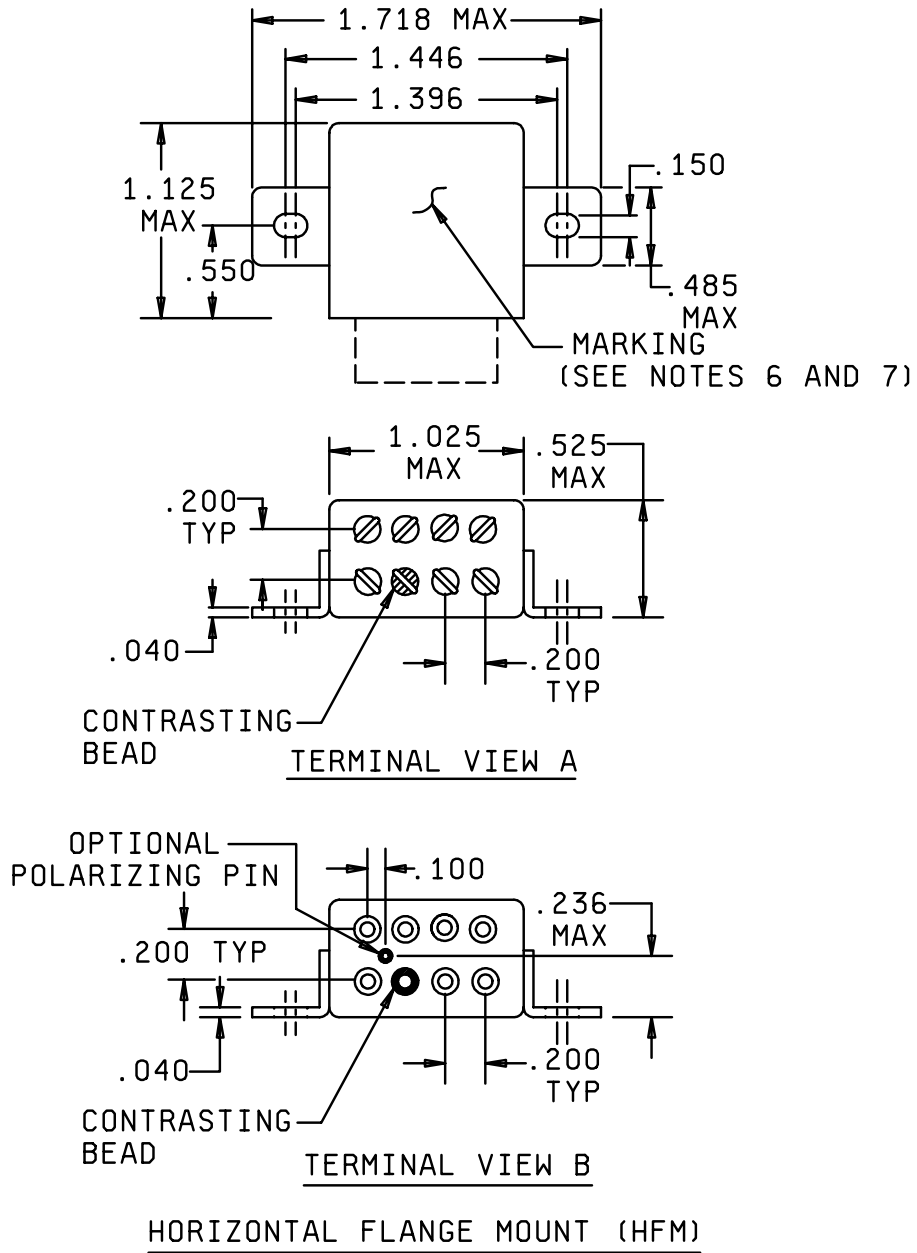


FIGURE 1. Dimensions and configurations - Continued.

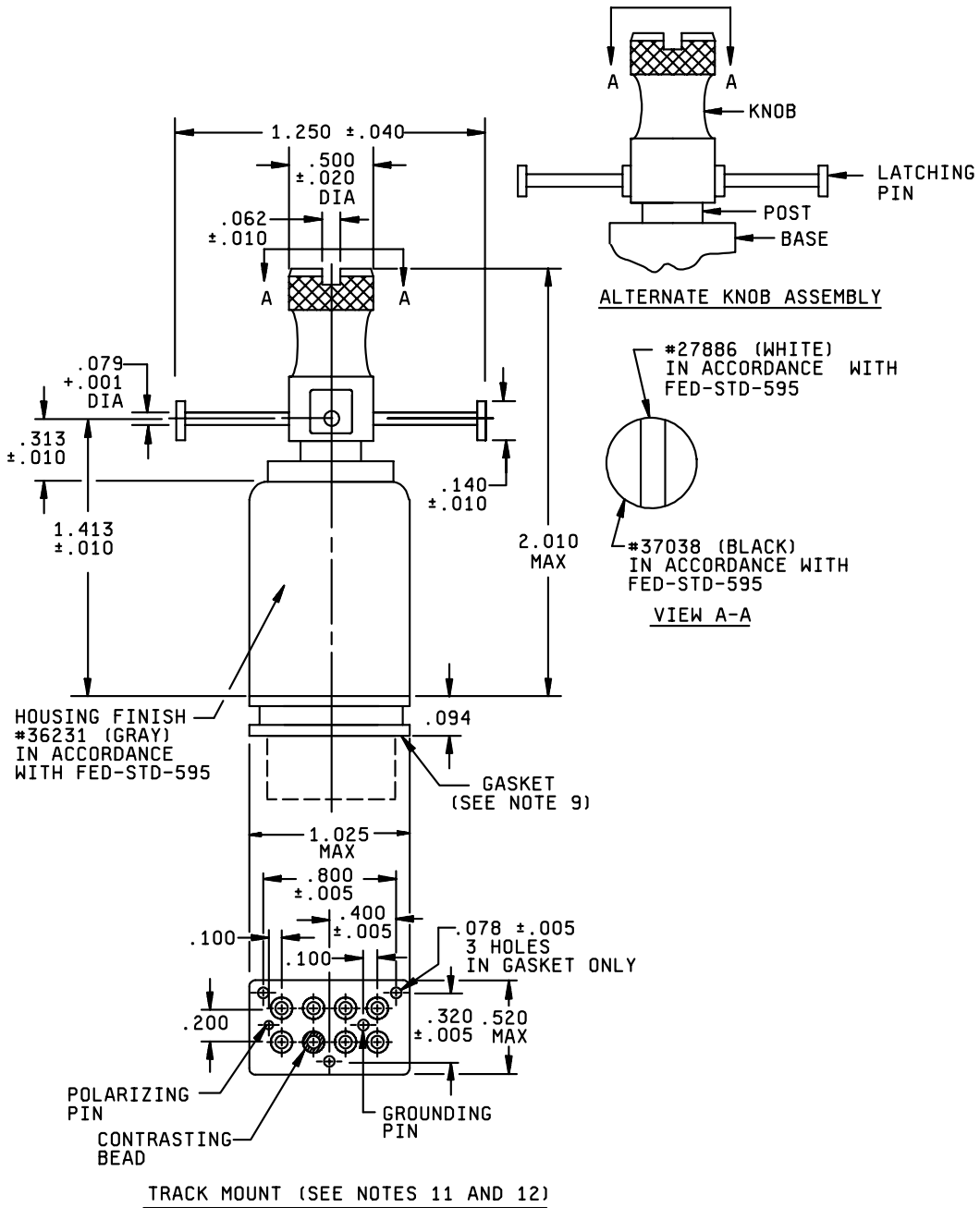


FIGURE 1. Dimensions and configurations - Continued.

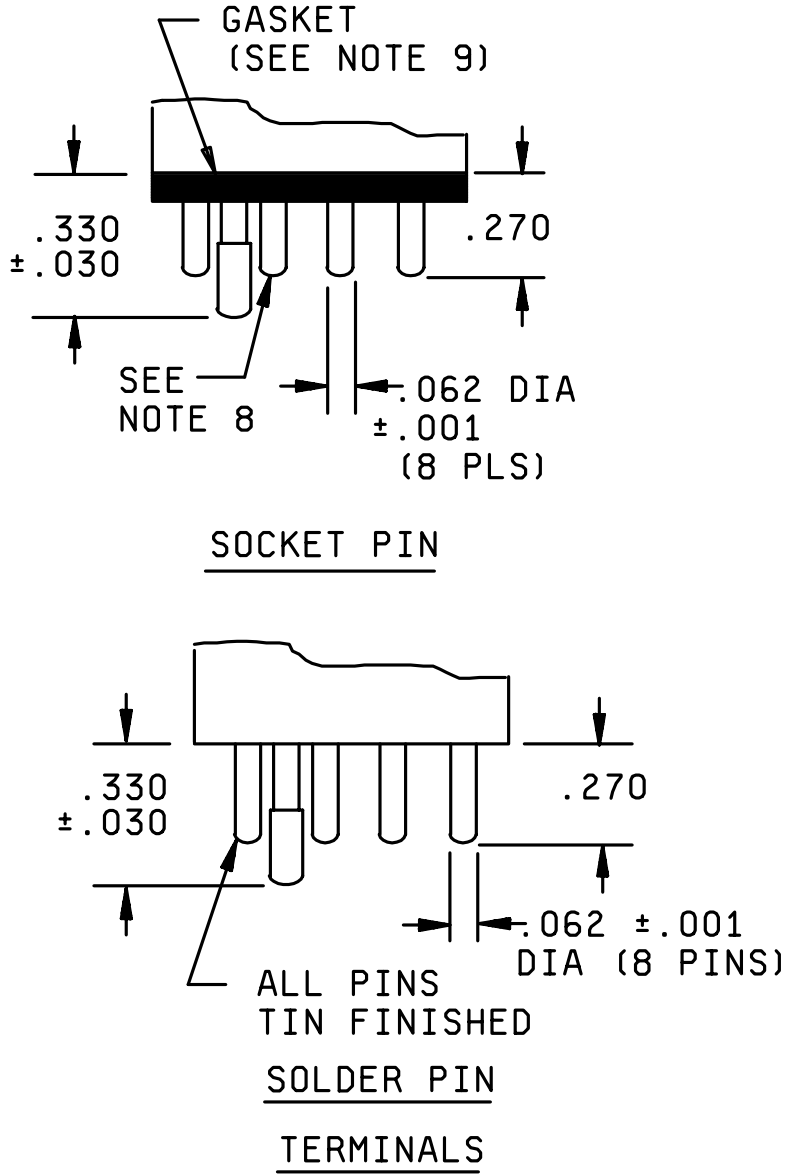


FIGURE 1. Dimensions and configurations - Continued.

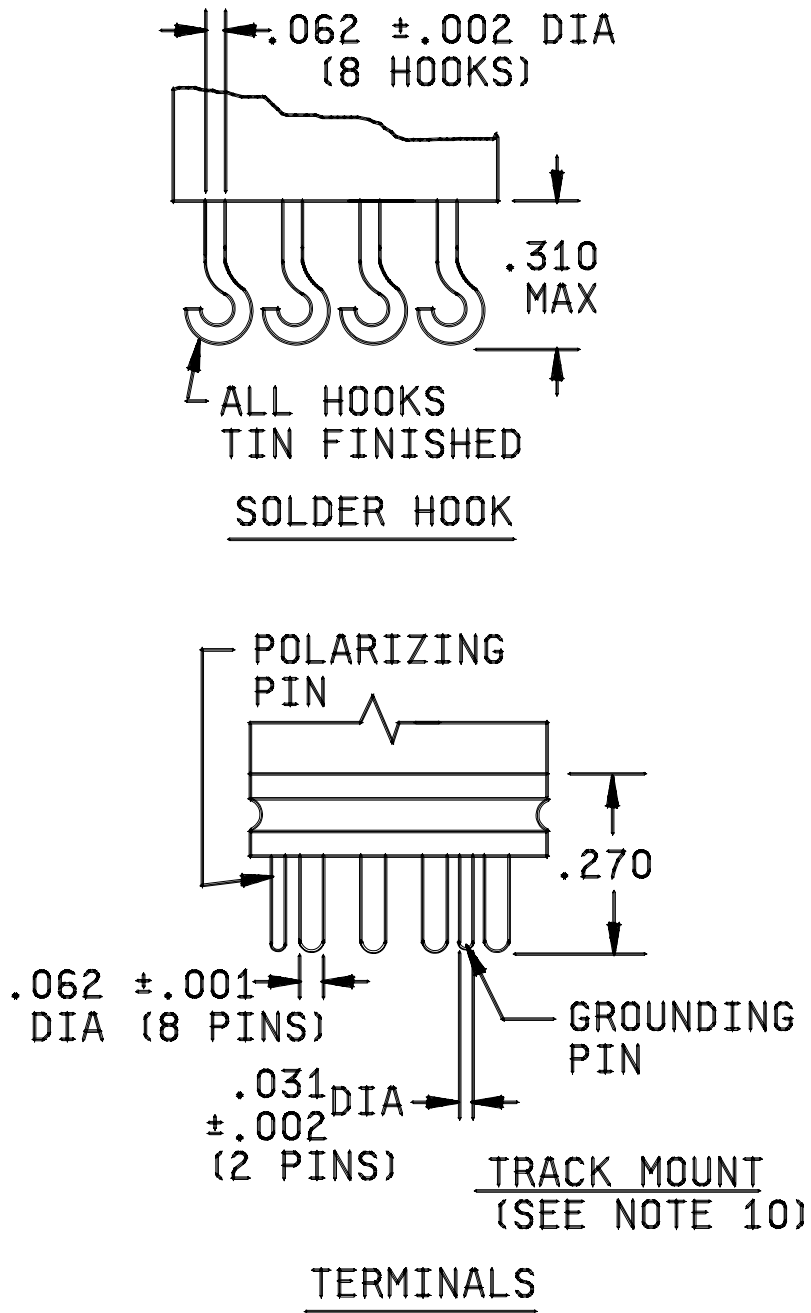
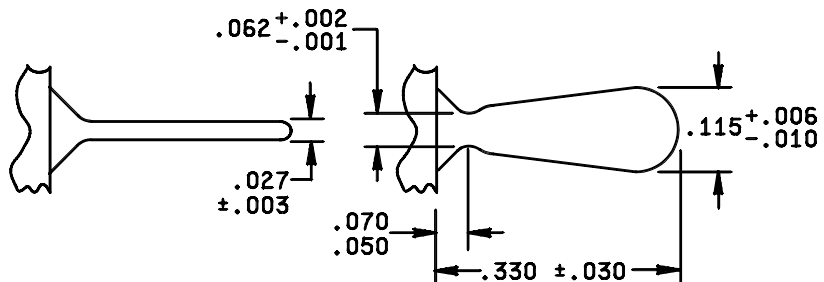
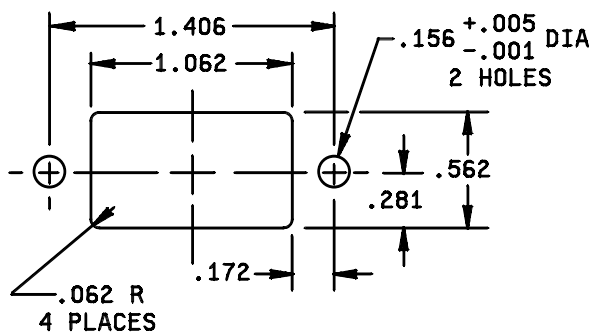


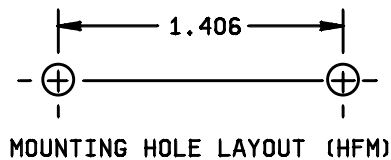
FIGURE 1. Dimensions and configurations - Continued.



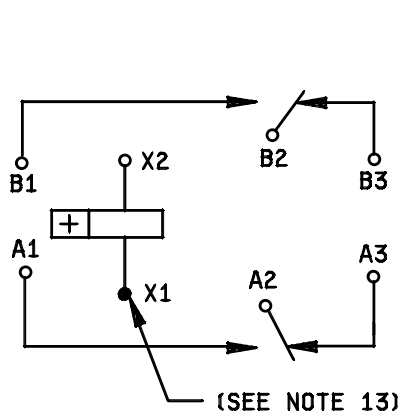
**POLARIZING PIN DETAILS**  
**(FINISH: TIN PLATE OR GOLD PLATED)**



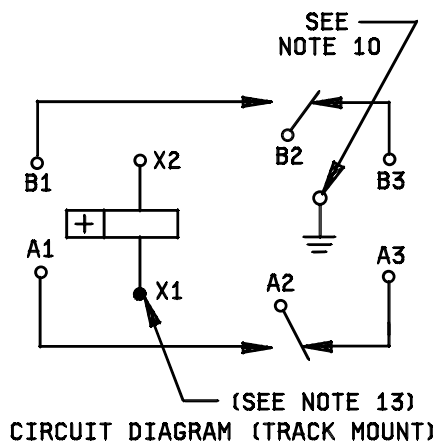
**MOUNTING HOLE LAYOUT (RVFM)**  
**(SOLDER HOOK TERMINALS)**



**MOUNTING HOLE LAYOUT (HFM)**



**CIRCUIT DIAGRAM (NO MOUNT, RVFM, AND HFM)**



**CIRCUIT DIAGRAM (TRACK MOUNT)**

FIGURE 1. Dimensions and configurations - Continued.

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Inches	mm	Inches	mm	Inches	mm	Inches	mm
.001	0.03	.062	1.57	.263	6.68	.800	20.32
.002	0.05	.070	1.78	.270	6.86	1.010	25.65
.003	0.08	.078	1.98	.281	7.14	1.025	26.04
.005	0.13	.079	2.01	.310	7.87	1.062	26.97
.006	0.15	.094	2.39	.313	7.95	1.250	31.75
.010	0.25	.100	2.54	.330	8.38	1.396	35.46
.020	0.51	.115	2.92	.400	10.16	1.406	35.71
.027	0.69	.140	3.56	.485	12.32	1.413	35.89
.030	0.76	.150	3.81	.500	12.70	1.446	36.73
.031	0.79	.156	3.96	.520	13.21	1.718	43.64
.040	1.02	.172	4.37	.525	13.34	2.010	51.05
.050	1.27	.200	5.08	.562	14.27		

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is  $\pm .010$  (0.25mm).
4. There shall be affixed to the relay a suitable legible circuit diagram that identifies each terminal location specified.
5. Permanent magnet drive consists of a permanent magnet with its flux path switched and combined with the electro-magnet flux.
6. 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.
7. 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.
8. Socket pin terminals shall provide the operational, environmental, and interface characteristics to provide a reliable interconnect to gold-plated contacts. Terminals shall be gold plated. One system for gold plating that may be used is ASTM B488, type 3, class 1.25 with a nickel underplate of 50 to 150 microinches thick. The gold plating system shall enable the product to meet the performance requirements of this specification and shall be approved by the qualifying activity. The polarizing pin of the track mount relay only shall be gold plated.
9. Gasket shall provide a reliable seal between the relay and mating socket that will meet the environmental, operational, and interface requirements of the relay with the mating socket. The gasket shall have shore hardness 15 to 35, thickness  $.050 \pm .005$ . Gasket material according to AMS 3332 has been considered acceptable.
10. Grounding pin applicable to track mount relay only.
11. Track mount base, knob, latching pin and post shall be corrosion resistant. One way of ensuring corrosion resistance is to nickel plate stainless steel 303 with 100 microinches minimum thickness per McDonnell Douglas P.S.13112 (Deutsch Relays, Inc. Patent number 3,790,915) or equivalent 100 microinches thick minimum.
12. Track mount relay shall be capable of mating with M12883/50, configuration II. The latching pin shall be capable of withstanding an axial pull of 35 pounds, in a direction away from the knob, without degradation. The rotation of the knob mechanism shall be restricted such that the latching pins cannot be placed on the side opposite the M12883/50 bracket cutouts.
13. Indicated terminal shall be identified with a contrasting bead.
14. Plane of critical motion for vibration and shock is Y-axis.

FIGURE 1. Dimensions and configurations - Continued.



REQUIREMENTS:

Contact data:

Load ratings: See table I.

Low level: 10 to 50  $\mu$ 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 <sup>3</sup>	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.

Contact bounce: 1.0 millisecond maximum.

Contact stabilization time: 2.5 milliseconds maximum.

Overload current: 40 amperes dc, 50 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 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: 15 milliseconds maximum (400 Hz coils), 20 milliseconds maximum (for 50/400 Hz coils) 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: .1875 (4.763 mm).
- c. Side to side alternating fields: .0625 (1.588 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 M12883/50 bracket placed around the relay housing.

At 25°C  
TABLE III. Dash numbers and characteristics. 1/

Dash number 2/			Mount	Coil data											
Solder pin	Solder hook	Socket pin		At 25°C							Over temperature range			Maximum pickup voltage	
				Coil voltage (V ac) 3/		Frequency (Hz)	Coil current (amperes) maximum	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 voltage (V ac) 4/	High temperature test	Continuous Current test
				Rated	Max										
---	001	002	RVFM	115	122	400	.04	73	24	7	90	30	5	95.4	105
---	5/ 003	5/ 004	RVFM	115	122	400	.04	73	24	7	90	30	5	95.4	105
005	006	007	RVFM	115	122	50/60/400	.04	73	30	7	90	40	5	95.4	105
---	008	---	HFM	115	122	400	.04	73	24	7	90	30	5	95.4	105
---	009	---	HFM	115	122	50/60/400	.04	73	30	7	90	40	5	95.4	105
010	011	---	No mount	115	122	50/60/400	.04	73	30	7	90	40	5	95.4	105
---	---	012	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.

5/ Dash numbers -003 and -004 are rated for high shock and high vibration (see environmental characteristics for ratings).

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 at 500 V dc (all others).

Dielectric withstanding voltage <sup>3/</sup>:

	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 for 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, except that peak value shall be 200 g's for 6 ±1 ms (for dash numbers -003 and -004, 500 g's). 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 that frequency range shall be 10 to 3,000 Hz (for -003 and -004, 50 g's). 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 inspections. Test in accordance with MIL-STD-202, method 214, test condition IG (0.4 g<sup>2</sup>/Hz, 50 to 2000 Hz). Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

Vibration (random): Applicable to track mount only. Applicable to qualification only. Test in accordance with MIL-STD-202, method 214, test condition IJ, 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.

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

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Physical data:

Dimensions and configurations: See figure 1.

Weight: 0.10 pound (46 grams), 0.120 pound (54.5 grams) track mount.

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 .031 diameter terminals: 3 pounds  $\pm$ 0.3 pound (applicable to track mount terminals ground and polarizing pins only).

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): M83536/11 (dash number from table III and suffix letter designating failure rate level). PIN is a new term encompassing previous terms used in specifications such as part number, type designator, and identification number.

Qualification inspection:

Qualification inspection and sample size: See table IV.

TABLE IV. Qualification inspection and sample size. <sup>1/</sup>

Single submission	Group submission	
18 units plus 1 open unit for level L at C = 0 33 units plus 1 open unit for level M at C = 0 Qualification inspection as applicable	M83536/11-007	18 units plus 1 open unit for level L at C = 0
	M83536/11-007	33 units plus 1 open unit for level M at C = 0
	M83536/11-007	Qualification inspection as applicable
	M83536/11-006	2 units, qualification
	M83536/11-008	inspection table,
	M83536/11-003	group II, shock, vibration,
	M83536/11-004	acceleration, terminal
	strength, and seal	
	2 units, qualification	
	inspection table, group II	

<sup>1/</sup> 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 M83536/11-
MS27401-7	001
8	002
11	003
12	004
15	001
16	002
22	008
24	008
28	006
29	009
30	007
34	006
35	009
36	007
45	005
54	011
55	010
56	011
57	010
M6106/1-002	012

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Custodian:

Army - CR  
Navy - EC  
Air Force -11  
DLA - CC

Preparing activity:

DLA - CC

(Project 5945-1175)

Review activities:

Air Force - 99