

PERFORMANCE SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, 1PDT,
LOW LEVEL TO 10 AMPERES, PERMANENT MAGNET DRIVE, HERMETICALLY SEALED
ALL WELDED, TRANSIENT SUPPRESSED DC COIL

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
and MIL-PRF-83536.

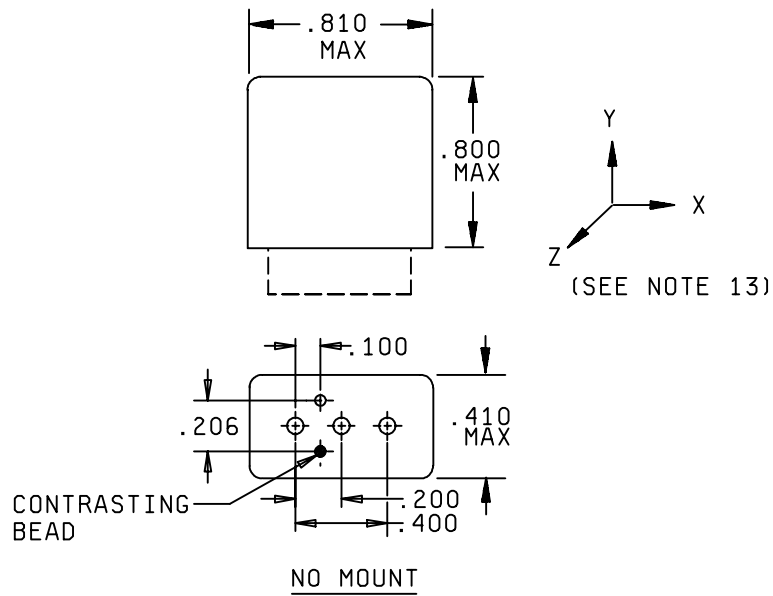
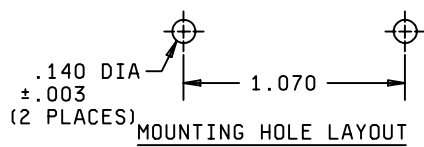
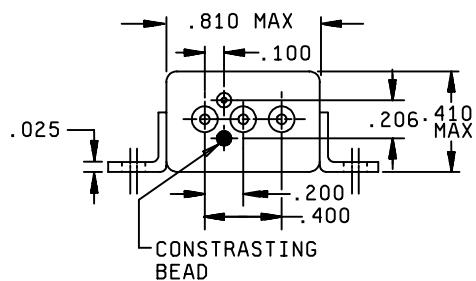
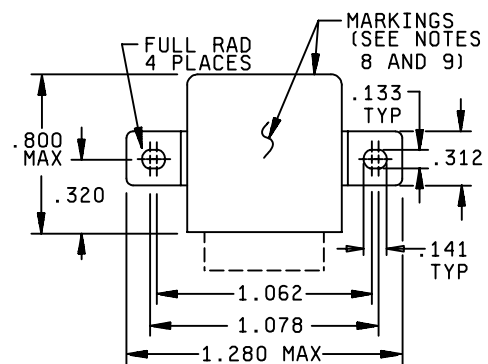


FIGURE 1. Dimensions and configurations.



HORIZONTAL FLANGE MOUNT (HFM)

FIGURE 1. Dimensions and configurations – Continued.

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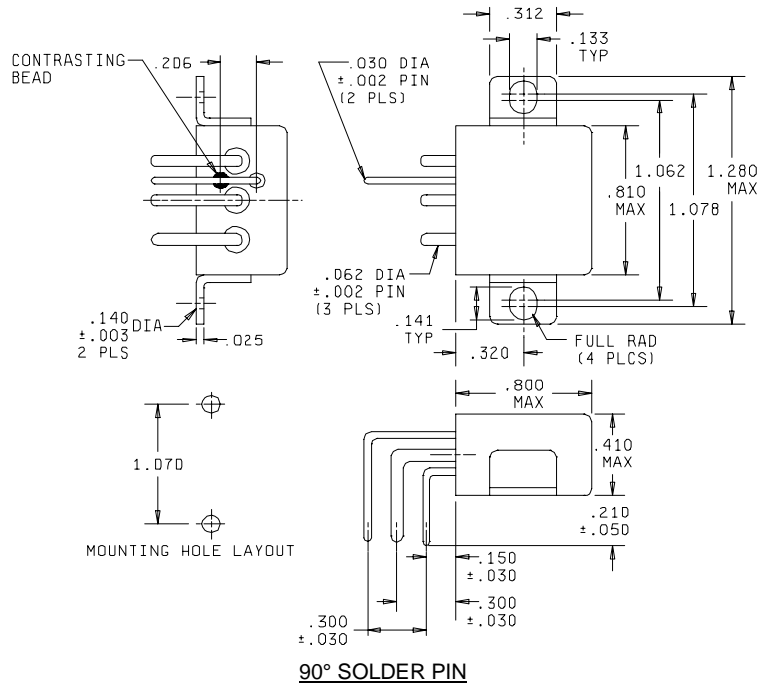
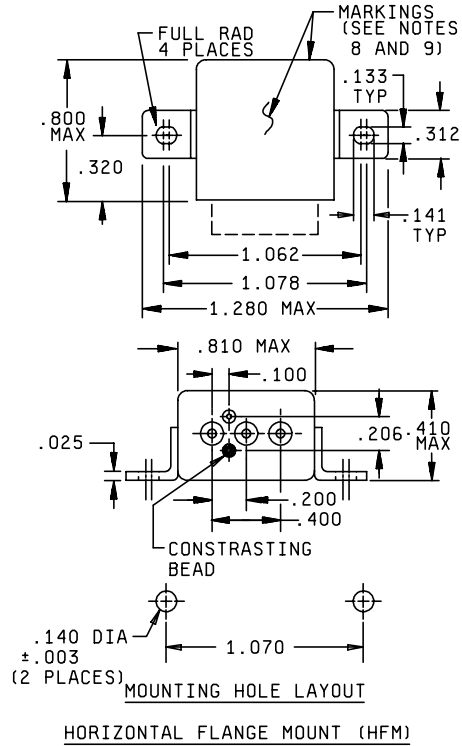


FIGURE 1. Dimensions and configurations – Continued.

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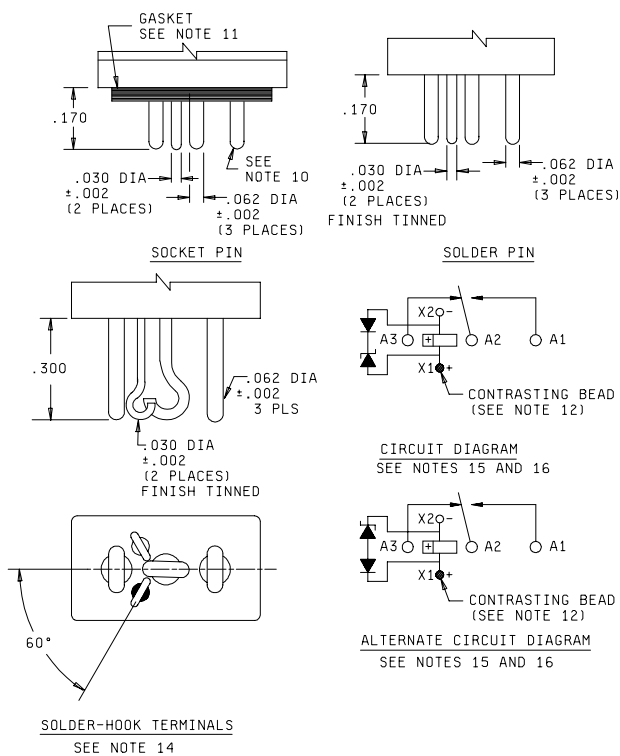


FIGURE 1. Dimensions and configurations – Continued.

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Inches	mm	Inches	mm	Inches	mm
.001	0.03	.141	3.58	.460	11.68
.002	0.05	.156	3.98	.500	12.70
.003	0.08	.170	4.32	.600	15.24
.025	0.64	.200	5.08	.640	16.26
.030	0.76	.230	5.84	.712	18.08
.031	0.79	.250	6.35	.810	20.57
.040	1.02	.300	7.62	.850	21.59
.062	1.57	.345	8.76	1.062	26.97
.110	2.79	.400	10.16	1.070	27.18
.115	2.92	.405	10.29	1.078	27.38
.133	3.38	.425	10.80	1.280	32.51
.140	3.56				

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is $.XXX \pm .010$ (0.25 mm) and $.XX \pm .03$ (0.76 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. This relay shall not operate or be damaged by reverse polarity.
7. Permanent magnet drive consists of a permanent magnet with its flux path switched and combined with the electro-magnet flux.
8. 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.
9. 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.
10. 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.
11. 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.
12. Indicated terminal shall be identified by a contrasting bead.
13. Plane of critical motion for vibration and shock is Y-axis.
14. Solder-hook terminal: Direction of hook opening is optional.
15. Back EMF (transient voltage): 42 V dc maximum.
16. Internal diode configuration is optional.

FIGURE 1. Dimensions and configurations – Continued.

REQUIREMENTS:

Contact requirements:

Load ratings: See table I.

Low level: 10 μ A to 50 μ A at 10 mV 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
Resistive	50	10	10
Inductive	10	6	N/A
Inductive	20	N/A	8
Motor	50	4	4
Lamp	50	2	2

Life: 50,000 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 maximum 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 (ms) maximum.

Contact stabilization time: 2.5 milliseconds maximum.

Break bounce (normally open contacts): 0.1 milliseconds maximum.

Overload current: 30 amperes dc, 60 amperes ac.

Rupture current: 32 amperes dc, 80 amperes ac.

Time current relay characteristics: See table II.

TABLE II. Time current relay characteristics. 1/

Successive application	Amperes	Time
1	20	1 hour
2	30	20 seconds
3	75	2 seconds
4	150	0.53 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 four 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 1-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 requirements 1/: See table III.

Operate time: 6 milliseconds maximum with rated coil voltage at 25°C. 7 milliseconds maximum with rated coil voltage over the temperature range.

Release time: 6 milliseconds maximum with rated coil voltage at 25°C. 7 milliseconds maximum with rated coil voltage over the temperature range.

Duty rating: Continuous.

Coil transient suppression: Applicable; 42 V dc maximum.

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).

TABLE III. Dash numbers and characteristics. 1/

Dash number 2/				Mount	Coil requirements											
Solder pin	Solder hook	Socket pin	90° solder pin		At 25°C					Over temperature range			Maximum pickup Voltage			
				Coil voltage (V dc) 3/	Coil resistance (ohms) minimum	Specified pickup voltage (V dc) 4/	Specified hold voltage (V dc) 4/	Specified dropout voltage (V dc) 4/	Specified pickup voltage (V dc) 4/	Specified hold voltage (V dc) 4/	Specified dropout voltage (V dc) 4/	Specified pickup voltage (V dc) 4/	Specified hold voltage (V dc) 4/	Specified dropout voltage (V dc) 4/	High temperature test	Continuous current test
001	002	003	---	No mount	18	3.3	1.6	0.4	4.5	2.3	0.25	4.5	2.3	0.25	5.0	5.7
004	005	006	---	RVFM	18	3.3	1.6	0.4	4.5	2.3	0.25	4.5	2.3	0.25	5.0	5.7
007	008	---	009	HFM	18	3.3	1.6	0.4	4.5	2.3	0.25	4.5	2.3	0.25	5.0	5.7
010	011	012	---	No mount	85	6.5	3.3	0.75	9.0	4.5	0.5	9.0	4.5	0.5	9.9	11.25
013	014	015	---	RVFM	85	6.5	3.3	0.75	9.0	4.5	0.5	9.0	4.5	0.5	9.9	11.25
016	017	---	018	HFM	85	6.5	3.3	0.75	9.0	4.5	0.5	9.0	4.5	0.5	9.9	11.25
019	020	021	---	No mount	440	13.5	5.5	2.3	18.0	7.0	1.5	18.0	7.0	1.5	19.8	22.5
022	023	024	---	RVFM	440	13.5	5.5	2.3	18.0	7.0	1.5	18.0	7.0	1.5	19.8	22.5
025	026	---	027	HFM	440	13.5	5.5	2.3	18.0	7.0	1.5	18.0	7.0	1.5	19.8	22.5
028	029	030	---	No mount	1400	24.0	10.0	3.0	36.0	12.0	2.4	36.0	12.0	2.4	40.0	44.0
031	032	033	---	RVFM	1400	24.0	10.0	3.0	36.0	12.0	2.4	36.0	12.0	2.4	40.0	44.0
034	035	---	036	HFM	1400	24.0	10.0	3.0	36.0	12.0	2.4	36.0	12.0	2.4	40.0	44.0

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/ When maximum ambient temperature does not exceed +85°C, the maximum coil voltage shall be 32 V dc.

Electrical requirements:

Insulation resistance:

Initial: 100 megohms at 500 V dc.

After life or environmental tests: 50 megohms at 500 V dc.

Dielectric withstanding voltage 2/:

	Coil to case	All other points
Sea level:		
Initial:	1,000	1,250
After life:	750	1,000
Altitude:		
At 80,000 feet:	250	250
At 300,000 feet:	500	500

Environmental characteristics:

Temperature range: -70°C to +125°C.

Maximum altitude rating: 300,000 feet.

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

Vibration (sinusoidal): Applicable, method 204 of MIL-STD-202, 30 g's except frequency range shall be 70 Hz to 3,000 Hz. Contact chatter shall not exceed 10 µs maximum for closed contacts and 1 µs maximum closure for open contacts.

Vibration (random): Applicable to qualification and group C inspection. Test in accordance with method 214 of MIL-STD-202, test condition IG (0.4 g²/Hz, 50 Hz to 2,000 Hz). Contact chatter shall not exceed 10 µs maximum for closed contacts and 1 µs maximum closure for open contacts.

Acceleration: Applicable, except 15 g's.

Physical requirements:

Dimensions and configurations: See figure 1.

Weight: 17 grams (0.60 ounce) maximum.

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

Terminal strength:

Solder hook terminals:

For .030 diameter terminals: 3 pounds \pm 0.3 pound.

For .062 diameter terminals: 10 pounds \pm 0.5 pound.

Bend: Not applicable.

Twist: Not applicable.

Solder pin terminals:

Pull force:

For .030 diameter terminals: 3 pounds \pm 0.3 pound.

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

Bend: Not applicable.

Twist: Not applicable.

Socket pin terminals:

Pull force:

For .030 diameter terminals: 3 pounds \pm 0.3 pound.

For .062 diameter terminals: 10 pounds \pm 0.5 pound.

Bend: Not applicable.

Twist: Not applicable.

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

Seal: Hermetic.

Marking: Applicable.

Part or Identifying Number (PIN): M83536/35 (dash number from table III and suffix letter designating failure rate level (FRL)). 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 sampling size. 1/

Single submission	Group submission	
19 units plus 1 open unit for level L at C = 0. <u>2/</u> 55 units plus 1 open unit for level M at C = 0. <u>2/</u> Qualification inspection as applicable.	M83536/35-022	19 units plus 1 open unit for level L at C = 0. <u>2/</u>
	M83536/35-022	55 units plus 1 open unit for level M at C = 0. <u>2/</u>
	M83536/35-022	Qualification inspection as applicable.
	M83536/35-020	2 units, qualification inspection table, group II, shock, vibration, acceleration, terminal strength, and seal.
	M83536/35-026	2 units, qualification inspection table, group II.

1/ For retention of qualification or extension of qualification to lower failure rate levels, all life test data accumulated on MIL-PRF-83536/34 data may be used in addition to the MIL-PRF-83536/35 data. Prior to performance of retention of qualification testing, the relay manufacturer shall preselect the sampling plan.

2/ 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.

Qualification inspection (reduced testing) (sample size – 2 units each coil voltage and 1 unsealed unit). See table V.

TABLE V. Qualification inspection (reduced testing).

Inspection
2 units each coil voltage Group Q2 of qualification inspection table 1 unsealed sample unit for internal inspection

Supersession requirements: Not applicable.

Custodians:
 Army – CR
 Navy – EC
 Air Force – 11
 DLA – CC

Preparing activity:
 DLA - CC
 (Project 5945-1059-26)

Review activities:
 Army - MI