

INCH-POUND

MIL-PRF-6106/39F
19 April 2012
SUPERSEDING
MIL-PRF-6106/39E
22 November 2010

PERFORMANCE SPECIFICATION SHEET

RELAY, ELECTROMAGNETIC, TYPE I, MAGNETIC LATCH, PERMANENT
MAGNET DRIVE, LOW LEVEL TO 5 AMPERES, 4PDT,
HERMETICALLY SEALED

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

The requirements for acquiring the relay described herein
shall consist of this specification sheet and [MIL-PRF-6106](#).

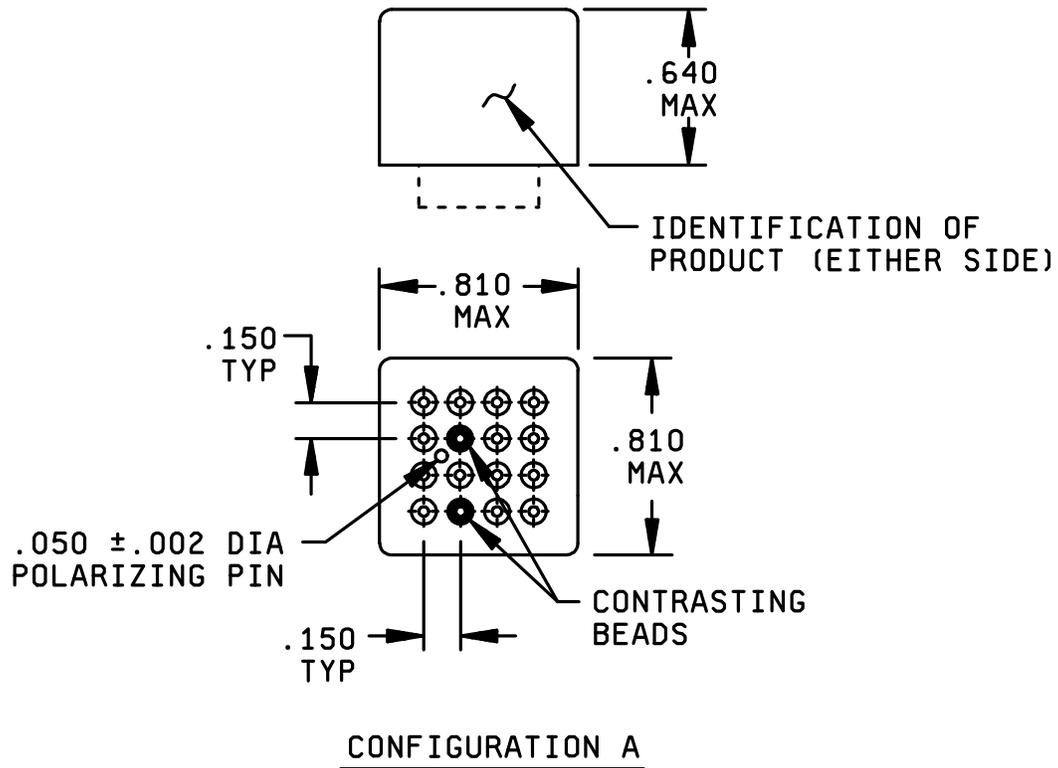


FIGURE 1. Dimensions and configurations.

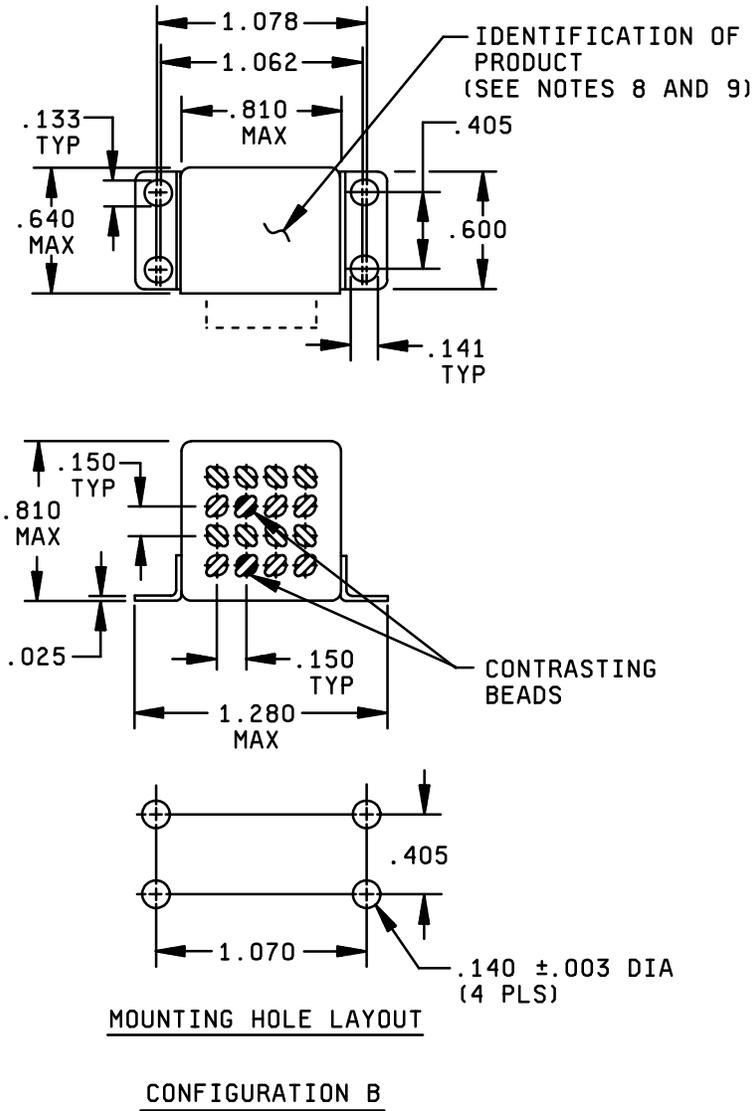


FIGURE 1. Dimensions and configurations - Continued.

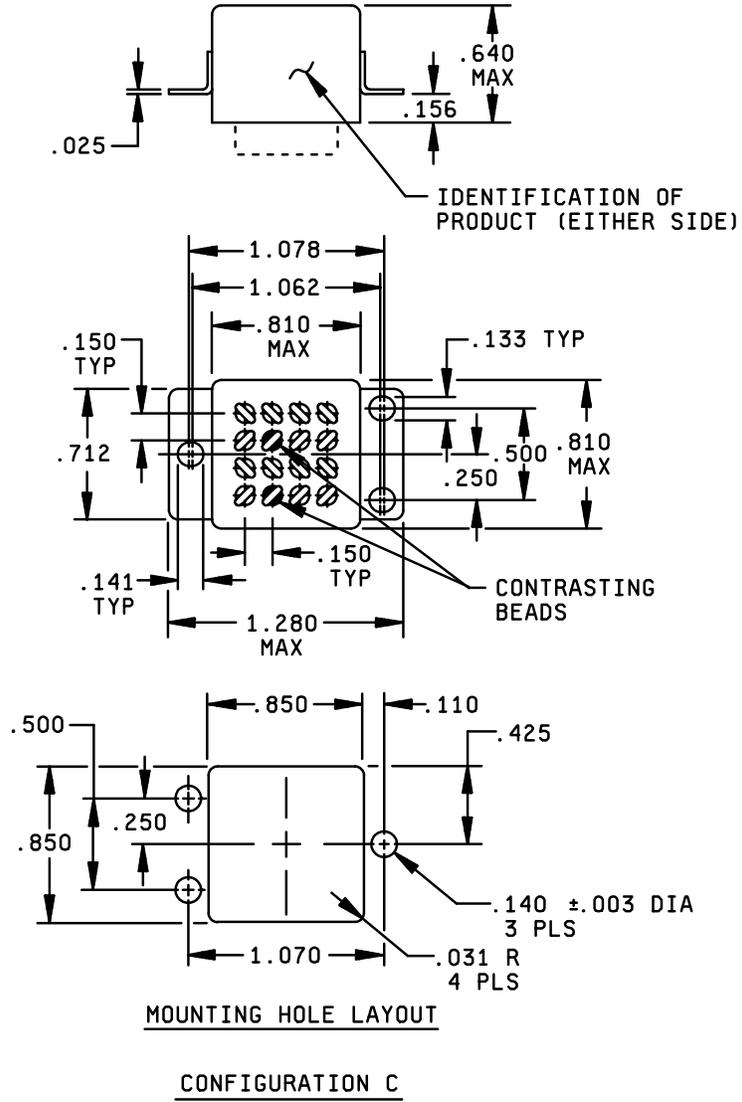


FIGURE 1. Dimensions and configurations - Continued.

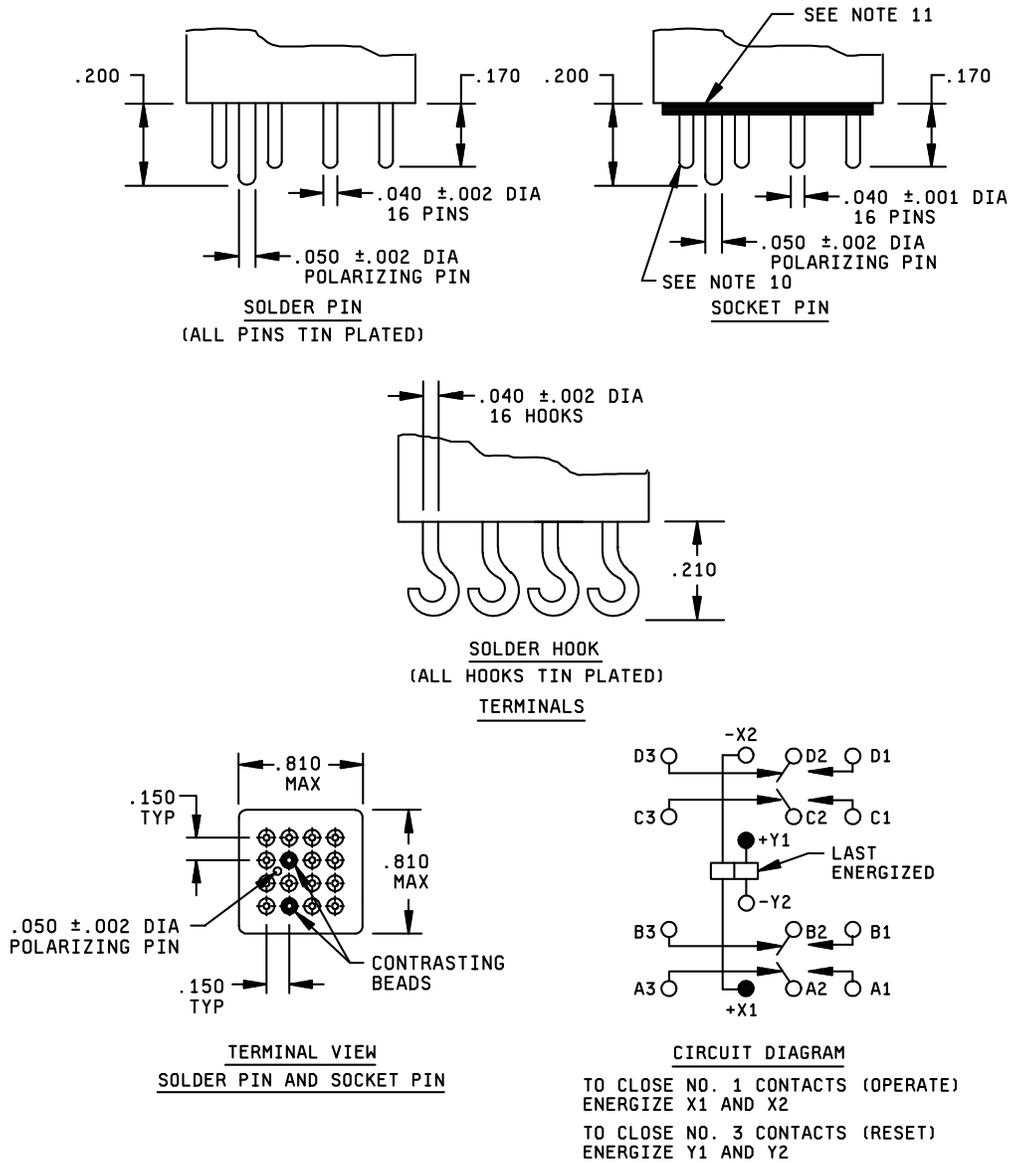


FIGURE 1. Dimensions and configurations - Continued.

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Inches	mm	Inches	mm	Inches	mm
.001	0.03	.133	3.38	.425	10.80
.002	0.05	.140	3.56	.500	12.70
.003	0.08	.141	3.58	.640	16.26
.025	0.64	.150	3.81	.712	18.08
.031	0.79	.156	3.96	.810	20.57
.040	1.02	.170	4.32	.850	21.59
.050	1.27	.200	5.08	1.062	26.97
.075	1.91	.210	5.33	1.070	21.18
.110	2.79	.250	6.35	1.078	27.38
				1.280	32.51

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are ± 0.010 (0.25 mm).
4. There shall be affixed to the relay a legible circuit diagram that identifies each terminal location specified.
5. These relays are polarized bistable.
6. This relay shall not operate or be damaged by reverse polarity. Semiconductors shall not be used for this purpose.
7. Permanent magnet drive consists of a permanent magnet with its flux path switched and combined with the electromagnetic flux.
8. Applicable to configuration B 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 configuration B only. Relays shall be marked with the manufacturer's name or source code and date code. In addition, ER relays shall be marked with the serial number. 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, except the polarizing pin, 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 25 ± 5 , thickness $.050 \pm .005$. Gasket material according to [SAE-AMS3332](#) has been considered acceptable.
12. Indicated terminals shall be identified by a contrasting bead.

FIGURE 1. Dimensions and configurations - Continued.

REQUIREMENTS:

CONTACT DATA:

Life: Unless otherwise specified, 100,000 cycles.

Operational reliability: Applicable, the alternate low level method shall be used.

Load ratings.

High level (relay case grounded).

Resistive: 5 amperes at 28 V dc, 115 V ac, 400 Hz, 1 phase, 115/200 V ac, 400 Hz, 3 phase.

Inductive: 3 amperes at 28 V dc, 5 amperes at 115 V ac, 400 Hz, 1 phase; 5 amperes at 115 V ac, 400 Hz, 3 phase (Life 20,000 cycles).

Motor: 2 amperes at 28 V dc, 3 amperes at 115 V ac, 400 Hz, 1 phase, 5 amperes at 115 V ac, 400 Hz, 3 phase.

Lamp: 1 ampere at 28 V dc, 1 ampere at 115 V ac, 400 Hz, 1 phase.

Low level: 10 to 50 μ A at 10 to 50 mV dc or peak ac. [1/](#) [2/](#) [3/](#)

Intermediate current: Applicable.

Transfer load: Not applicable.

Mechanical life (reduced current): 1.25 amperes at 28 V dc, 115 V ac, 400 Hz, 1 phase, 115 V ac, 400 Hz, 3 phase (Life, 400,000 cycles).

Mixed loads: Applicable. [1/](#)

Contact voltage drop or resistance. [2/](#) [3/](#)

High level:

Initial: 0.150 volt maximum.

After life: 0.175 volt maximum.

Low level:

Initial: 0.050 ohm maximum.

Afterlife: 0.150 ohm maximum.

Contact bounce: 0.5 millisecond maximum.

[1/](#) Relay shall be capable of switching low level while switching any of the other rated loads on adjacent contacts.

[2/](#) For low level, the following shall apply:

a. During endurance and operational reliability testing, contact load shall be 10 to 50 microamperes, 10 to 50 millivolts open circuit voltage, 100 ohms maximum contact resistance.

b. Static contact resistance shall be performed at 50 mA maximum, 50 mV maximum.

[3/](#) For group A contact voltage drop test, high level testing shall be performed first, followed by low level testing. The contacts shall not make or break the high level load.

Overload current: 20 amperes dc.
30 amperes ac.

Rupture current: 25 amperes dc.
40 amperes ac.

Time current relay characteristics. Applicable (see [table I](#)).

TABLE I. Time current relay characteristics. [1/](#) [2/](#)

1	10A	1 hour
2	15A	20 seconds
3	37.5 A	2 seconds
4	75A	.53 second

[1/](#) CAUTION: Compare with time current characteristics of the associated circuit protective device.

[2/](#) 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 1](#). 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 [4/](#) (See [table II](#)).

Operate 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.

ELECTRICAL DATA

Insulation resistance, initial: 100 megohms at 500 V dc.

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

Dielectric withstanding voltage (sea level):	Initial <u>V rms (60 Hz)</u>	After life tests <u>V rms (60 Hz)</u>
Coil to case	500	350
Coil to coil	500	350
All other points	1,000	750

Dielectric withstanding voltage (altitude): 5/	80,000 feet <u>V rms (60 Hz)</u>	300,000 ft <u>V rms (60 Hz)</u>
Coil to case	250 V rms	500 V rms
Coil to coil	250 V rms	500 V rms
All other points	250 V rms	500 V rms

[4/](#) 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 inch.
- b. Row to row opposing fields, .1875 inch.
- c. Side to side alternating fields, .0625.
- d. Side to side like fields, .125 inch.

[5/](#) Dielectric may be improved by suitable insulation of terminals and wiring after installation.

TABLE II. Dash numbers and characteristics. 1/

Military PIN M6106/39-	Terminal type	Mounting config.	Coil data						
			Rated voltage (V dc) <u>2/</u>	Resist- ance Ω $\pm 10\%$ at 25°C	Maximum		Pickup volt (max) (V dc)		
					Voltage (V dc) <u>3/</u>	Current A at 25°C	Normal <u>4/</u>	High temp test	Continuing current test
001	Solder hook	C	28	600	29	.054	18	19.8	22.5
002 <u>5/</u>	Socket pin	C	28	600	29	.054	18	19.8	22.5
003	Solder pin	C	28	600	29	.054	18	19.8	22.5
004	Solder hook	B	28	600	29	.054	18	19.8	22.5
005	Solder pin	A	28	600	29	.054	18	19.8	22.5
006	Solder pin	B	28	600	29	.054	18	19.8	22.5

1/ Each relay has 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/ CAUTION: Use of any coil voltage less than rated coil voltage will compromise the operation of the relay.

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

4/ Over the temperature range.

5/ Use MIL-DTL-12883/44, PIN M12883/44-002, for mating socket.

ENVIRONMENTAL CHARACTERISTICS

Temperature range: -70°C to +125°C.

Maximum altitude rating: 300,000 feet.

Acceleration: Applicable (15 g's maximum).

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

Vibration (sinusoidal): Configurations A and C shall be 30 g's, 70 to 3,000 Hz. Configuration B 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 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 4g²/Hz, 50 to 2,000 Hz), 15 minutes each plane, for horizontal flange mount test condition IE (0 2g²/Hz). Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

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PHYSICAL DATA

Terminal strength:

Solder hook terminals:

Twist test: Applicable.

Pull force: 5 ± 0.5 pounds.

Solder pin terminals:

Bend test: Applicable.

Pull force (.040 diameter): 5 ± 0.5 pounds.

Pull force (.050 diameter): 10 ± 1 pounds (applicable to polarizing pin only).

Plug-in terminals:

Bend test: Applicable.

Pull force (.040 diameter): 5 ± 0.5 pounds.

Pull force (.050 diameter): 10 ± 1 pounds (applicable to polarizing pin only).

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

Dimensions and configurations: See [figure 1](#).

Weight (maximum): 0.064 pound (29.1 grams).

Seal: Hermetic, relays shall be sealed by welding, such as laser, TIG (tungsten inert gas), or other suitable means as approved by the qualifying activity.

Construction (internal and external): All welded, except that coil magnet wire to coil lead wire shall be soldered.

(PIN): M6106/39- (dash number from [table II](#)).

Qualification by similarity: See [MIL-PRF-6106](#).

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Referenced documents. In addition to [MIL-PRF-6106](#), this document references the following:

[MIL-DTL-12883/44](#) [MIL-STD-202](#) [ASTM B488](#) [SAE-AMS3332](#)

Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

(Project 5945-2012-003)

Review activities:
Air Force - 99

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