

INCH-POUND

MIL-PRF-6106/19G  
18 November 2011  
SUPERSEDING  
MIL-PRF-6106/19F  
10 November 2000

PERFORMANCE SPECIFICATION SHEET

RELAY, ELECTROMAGNETIC PERMANENT MAGNET DRIVE,  
25 AMPERES, SPDT, 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](#).

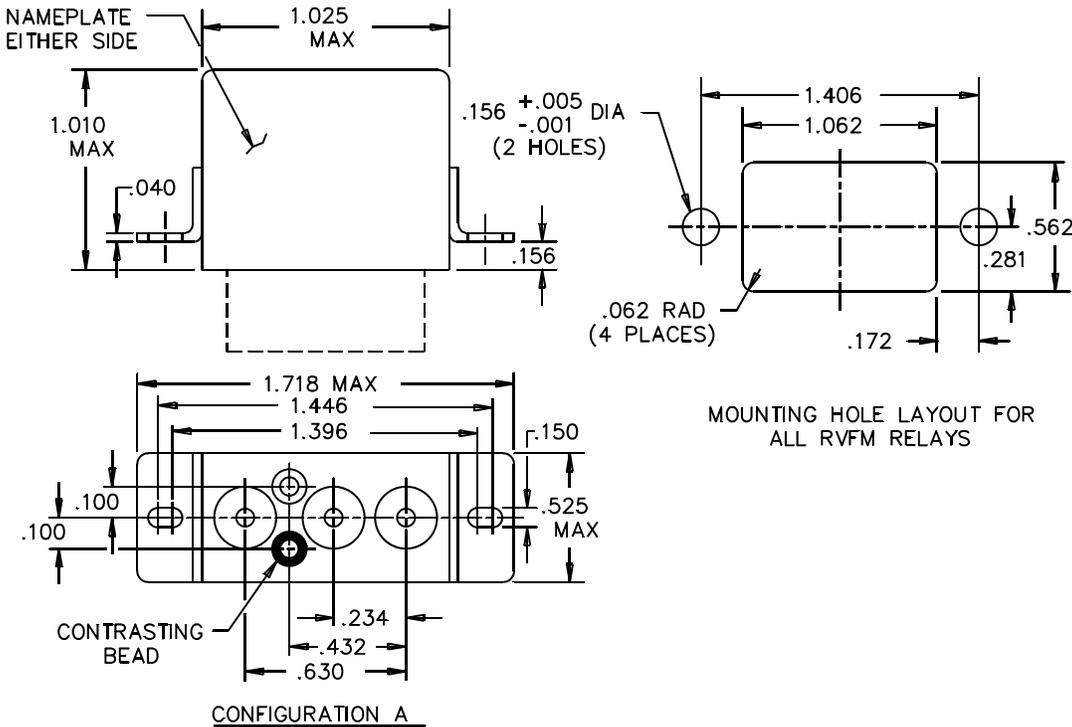


FIGURE 1. Relay, outline drawing.

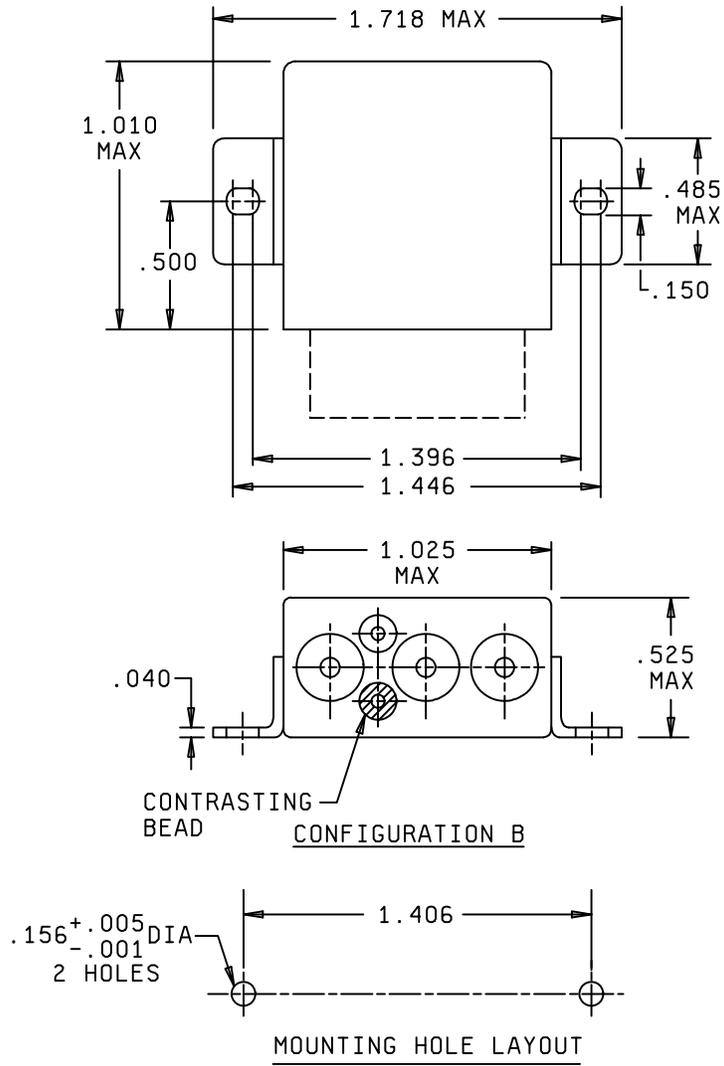
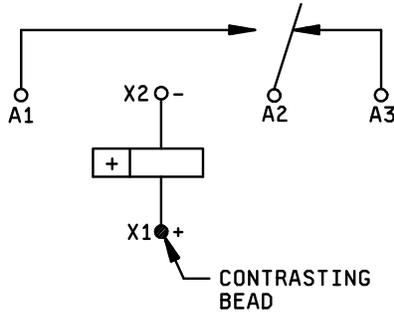
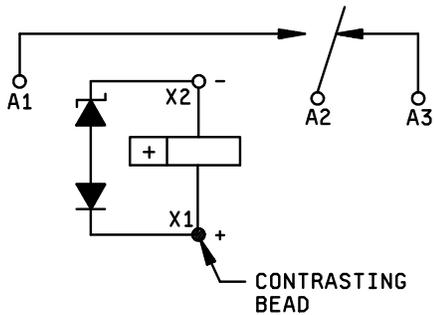


FIGURE 1. Relay, outline drawing - Continued.



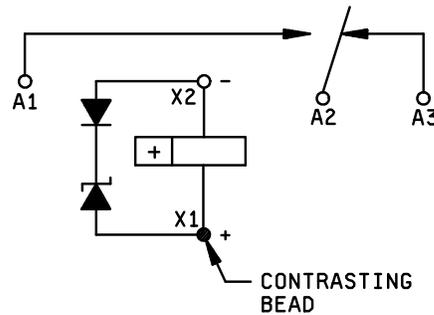
CIRCUIT A

(FOR DETAILS, SEE TABLE I)



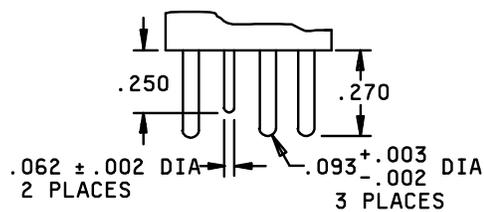
CIRCUIT B

(FOR DETAILS, SEE TABLE I)



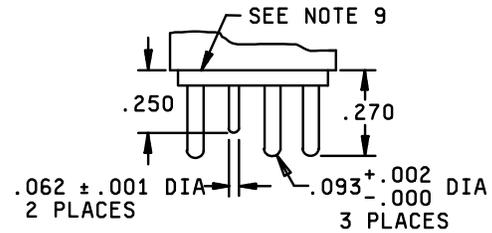
CIRCUIT B

ALTERNATE INTERNAL DIODE CONFIGURATION  
(FOR DETAILS, SEE TABLE I)



FINISH: TINNED

SOLDER PIN TERMINAL

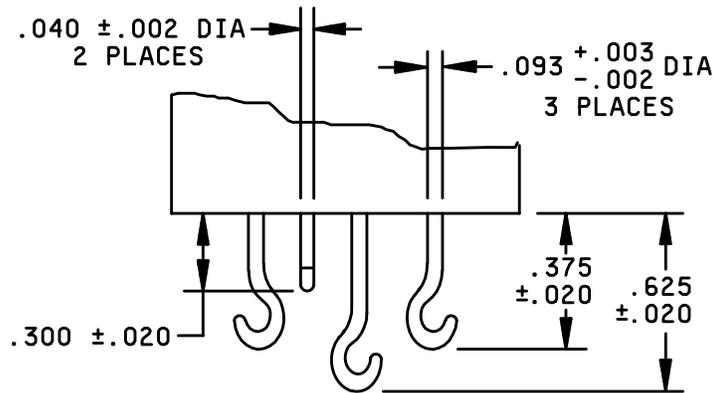


FINISH: GOLD-SEE NOTE 8

SOCKET PIN TERMINAL

FIGURE 1. Relay, outline drawing - Continued.

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**SOLDER HOOK TERMINAL**  
(ALL HOOKS TIN PLATED)

Inches	mm	Inches	Mm	Inches	mm
.001	0.03	.156	3.96	.525	13.34
.002	0.05	.172	4.37	.562	14.27
.003	0.08	.234	5.94	.625	15.88
.005	0.13	.250	6.35	.630	16.00
.020	0.51	.270	6.86	1.010	25.65
.040	1.02	.281	7.14	1.025	26.04
.050	1.27	.300	7.62	1.062	26.97
.062	1.57	.375	9.52	1.396	35.46
.093	2.36	.432	10.97	1.406	35.71
.100	2.54	.485	12.32	1.446	36.73
.150	3.61	.500	12.70	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  $\pm 0.010$  (0.25 mm).
4. Terminal numbers need not appear on the relay header provided there is a suitable legible circuit diagram affixed to the relay that identifies each terminal location specified.
5. Relay must not operate or become damaged by reverse polarity. Semiconductors shall not be used for this purpose.
6. Hook terminals will accept one no. 12 AWG stranded wire.
7. Permanent magnet drive consists of permanent magnet with its flux path switched and combined with the electromagnetic flux.
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. Gold plating of the polarizing pin is optional. 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.
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  $20 \pm 5$ , thickness  $.050 \pm .005$ . Gasket material according to [SAE-AMS 3332](#) has been considered acceptable.

FIGURE 1. Relay, outline drawing - Continued.

TABLE I. Mechanical and electrical characteristics.

Dash number	Relay type	Coil <u>1/</u> <u>2/</u> suppression	Terminal type	Mounting Configuration	Coil circuit	Time current relay characteristic at 25°C
-003	I	Not applicable	Solder hook	A	A	Not applicable
-004	I	Not applicable	Socket, pin	A	A	Not applicable
-005	I <u>3/</u>	Not applicable	Solder, pin	A	A	Applicable
-006	I <u>3/</u>	Not applicable	Solder hook	A	A	Applicable
-007	I <u>3/</u>	Not applicable	Socket, pin	A	A	Applicable
-008	I <u>3/</u>	Not applicable	Solder, pin	B	A	Applicable
-009	I <u>3/</u>	Not applicable	Solder hook	B	A	Applicable
-010	I	Not applicable	Solder, pin	A	A	Applicable
-011	I	Not applicable	Solder hook	A	A	Applicable
-012	I	Not applicable	Socket, pin	A	A	Applicable
-013	I	Not applicable	Solder, pin	B	A	Applicable
-014	I	Not applicable	Solder hook	B	A	Applicable
-015	I	42 V dc, max	Solder, pin	A	B	Applicable
-016	I	42 V dc, max	Solder hook	A	B	Applicable
-017	I	42 V dc, max	Socket, pin	A	B	Applicable
-018	I	42 V dc, max	Solder, pin	B	B	Applicable
-019	I	42 V dc, max	Solder hook	B	B	Applicable
-020	I <u>3/</u>	42 V dc, max	Solder, pin	A	B	Applicable
-021	I <u>3/</u>	42 V dc, max	Solder hook	A	B	Applicable
-022	I <u>3/</u>	42 V dc, max	Socket, pin	A	B	Applicable
-023	I <u>3/</u>	42 V dc, max	Solder, pin	B	B	Applicable
-024	I <u>3/</u>	42 V dc, max	Solder hook	B	B	Applicable
-025	I	Not applicable	Solder hook	B	A	Not applicable

- 1/ Relays using suppression devices shall continue to operate should the suppression circuit be in a failure mode.
- 2/ Diodes shall have a peak inverse voltage of 600 V dc minimum when used and shall be JANTX or JANTX screened after 30 December 1980.
- 3/ Screened relays shall be tested to group A1 inspections of the group A inspection table. Additional life testing is not required.

TABLE II. Dash numbers and operating characteristics.

Dash No.	Coil terminal	Coil data										Time (milliseconds) (max)						
		Nominal			Maximum		Max pickup voltage			Oper. <u>3/</u>	Rel. <u>4/</u>	Contact bounce				Break bounce NO only <u>5/</u>		
		Volts <u>1/</u>	Freq. Hz	Res. ohms $\pm 10\%$ at 25°C	Volts	Amp	Norm <u>2/</u>	High temp test	Cont. curr.			Hold voltage <u>2/</u>	Dropout voltage <u>2/</u>	Main			Aux	
														NO	NC		NO	NC
-003 through -025	X1 - X2	28	dc	320	29	0.11	18	19.8	22.5	7.0	1.5	10	10	1.0	1.0	---	---	0.10

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

2/ Over the temperature range.

3/ With nominal coil voltage.

4/ From nominal coil voltage.

5/ Applicable to dash numbers -015 through -024 only.

REQUIREMENTS:

Contact data:

Load ratings: See [table III](#).

Intermediate current: Applicable.

Mixed loads: Applicable.

TABLE III. Rated contact load (amperes per pole) (case grounded).

Type of load	Endurance Life Operating cycles X 10 <sup>3</sup>	28 V dc	115 V ac, 1 phase		115/200 V ac, 3 phase <sup>1/</sup> 400 Hz
			400 Hz	60 Hz	
Resistive <sup>2/</sup>	50	25	25		
Inductive	10	12	---		
Inductive	20	---	15		
Motor	50	10	10		
Lamp	50	5	5		
Transfer load <sup>3/</sup>	---	---	---		
Mechanical life reduced current	200	6	6		
APPLICABLE ONLY TO DASH NOS. -003, -004, AND -025.					
Resistive	25			10	
Inductive	---			---	
Inductive	25			10	
Motor	25			8	
Lamp	---			---	
Transfer, load <sup>3/</sup>	---			---	
Mechanical life reduced current	100			2.5	

<sup>1/</sup> Absence of value indicates relay is not rated for 3 phase application.

<sup>2/</sup> For full rated load maximum temperature and altitude, use no. 12 wire or larger. Solder hook relays to be mounted to limit mounting bracket temperature to 160°C.

<sup>3/</sup> Transfer load indicates relay suitable for transfer between unsynchronized ac power supplies at rating indicated.

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Life: 50,000 cycles, unless otherwise specified (see [table III](#)).

Contact voltage drop or resistance:

Initial contact voltage drop: 0.150 V maximum. Rated resistive current at 6 V dc or peak ac. Relays shall not make or break this load.

Initial contact resistance: Not applicable.

High level life (contact voltage drop):

During life: 10 percent open circuit voltage maximum.

After life: 0.175 V maximum.

Intermediate current (contact resistance):

During intermediate current: 3 ohms maximum.

After intermediate current: 0.150 ohm maximum.

Coil data:

Coil data: See [table I](#) and [II](#).

Duty rating: Continuous.

Operational data:

Contact ratings: See [table III](#).

Operate time: See [table II](#).

Overload current: 50 amperes dc, 80 amperes ac, 400 Hz. [1/](#)

Rupture current: 60 amperes dc, 100 amperes ac, 400 Hz. [2/](#)

Physical:

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

Weight: 0.09 pound, 41 grams maximum.

Terminal type: See [figure 1](#) and [table I](#).

Strength of terminals and mounting studs: Applicable.

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

[1/](#) For -003, -004, and -025, 20 amperes ac, 60 Hz.

[2/](#) Not applicable to -003, -004 and -025.

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ENVIRONMENTAL DATA:

Temperature range: -70°C to +125°C. [1/](#)

Altitude rating: 300,000 feet maximum.

Shock: 200 g's.

Duration: 6 ms.

Duration contact opening: 10 microseconds maximum.

Vibration - sinusoidal: 30 g's.

Frequency range: 10 to 3,000 Hz.

Random vibration: [MIL-STD-202](#), method 214, test condition IG.

Duration: 15 minutes each plane.

Acceleration: 15 g's.

Insulation resistance, initial: 100 megohms.

After life or environmental tests: 50 megohms.

Dielectric withstanding voltage (sea level):

	Initial	After life test
Coil to case	1,000 V rms	1,000 V rms
All other points	1,250 V rms	1,000 V rms

Dielectric withstanding voltage (altitude): [2/](#)

	<u>80,000 feet</u>	<u>300,000 feet</u>
Coil to case	350 V rms	500 V rms
All other points	350 V rms	500 V rms

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

Part or Identifying Number (PIN). M6106/19- (dash number from table I).

[1/](#) For full rated load maximum temperature and altitude, use no. 12 wire or larger, solder hook relays shall be mounted to limit mounting bracket temperature to 160°C. This note is not applicable to -003, -004, and -025 and the requirements of [MIL-PRF-6106](#) for temperature and wire size shall apply.

[2/](#) Dielectric withstanding voltage rating may be improved by suitable insulation of terminals and wiring after installation. Plug in relays with suitable gasket compressed will have dielectric withstanding voltage capabilities at 80,000 feet over 500 V rms.

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TABLE IV. Time current relay characteristics at 25°C. [1/](#) [2/](#) [3/](#)

Amperes	Duration
30	1 hour
50	5.0 seconds
100	1.2 seconds
250	0.2 second
350	0.1 second

- [1/](#) Applicable to dash numbers-005 through -024.  
[2/](#) CAUTION: Compare with time current characteristics of the associated circuit protective device.  
[3/](#) Dash nos. -005 through -024. Relays shall sustain five applications (make and carry only) of power at each of five different current levels for the time durations in table IV. Separate relays shall be tested at 28 V dc and 115 V ac, 400 Hz. Cooling time between successive applications shall be 30 minutes. The test shall be performed on both normally open and normally closed contacts of each relay. There shall be no failures or evidence of welding or sticking and relays shall pass contact voltage drop at conclusion.

Cross reference for Government logistical support. See [table V.](#)

TABLE V. Cross reference for Government logistical support.

PIN M6106/19-	Support with PIN M6106/19-	PIN M6106/19-	Support with PIN M6106/19
003	003	015	020
004	004	016	021
005	020	017	022
006	021	018	023
007	022	019	024
008	023	020	020
009	024	021	021
010	020	022	022
011	021	023	023
012	022	024	024
013	023	025	025
014	024		

Supersession data: See [table VI.](#)

TABLE VI. Supersession data.

Superseded PIN M6106/19-	New PIN M6106/19-
001	011
002	012

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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

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

[MIL-STD-202](#)

[ASTM B488](#)

[SAE- AMS 3332](#)

Custodians:

Air Force - 85  
DLA - CC

Preparing activity:

DLA - CC

(Project 5945-2011-064)

Review activities:

Air Force - 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.daps.dla.mil/>.