

NOTE: The document identifier and heading has been changed on this page to reflect that this is a performance specification. There are no other changes to this document. The document identifier on subsequent pages has not been changed, but will be changed the next time this document is revised.

MIL-PRF-39016/47B  
20 JULY 1988  
 SUPERSEDING  
 MIL-R-39016/47A(EC)  
 27 October 1985

PERFORMANCE SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, DPDT,  
 LOW LEVEL TO 0.5 AMPERE (.100 D.I.P. TERMINAL SPACING)  
 ONE-TENTH SIZE, SENSITIVE, BI-STABLE, (LATCHING)

(B) 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 the latest issue of MIL-R-39016.

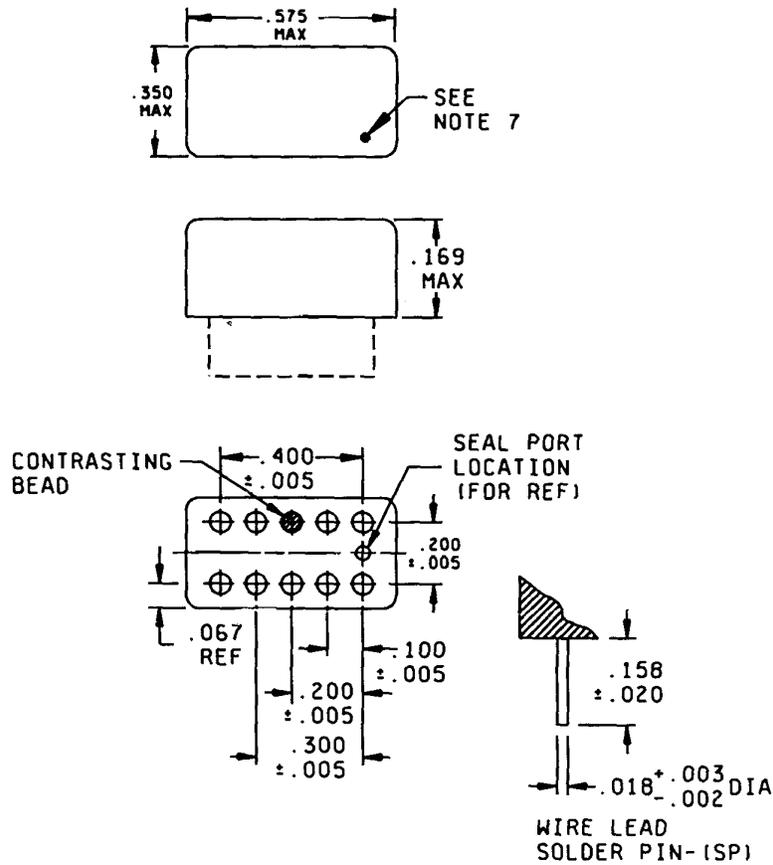
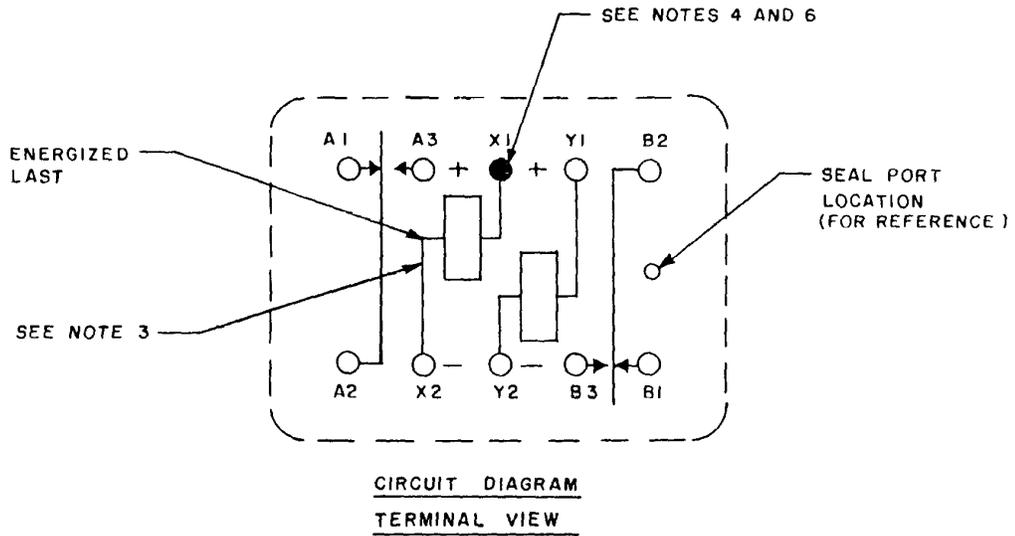


FIGURE 1. Dimensions and configuration.

(B) denotes changes



Inches	mm	Inches	mm
.002	0.05	.100	2.54
.003	0.08	.158	4.01
.005	0.13	.169	4.29
.018	0.45	.200	5.08
.020	0.51	.300	7.62
.067	1.70	.350	8.90
.083	2.10	.400	10.16
		.575	14.60

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Coil symbol is optional per MIL-STD-1285.
4. Indicated terminal X1 shall be identified with contrasting colored bead. Relays shall have plus (+) and minus (-) signs placed on circuit diagram as shown above, for X and Y terminals.
5. Terminal markings are for reference only.
6. Energizing the indicated coil (energized last), with the indicated polarity and voltage, shall cause the relay contacts to assume the position shown.
7. An orientation mark (position reference) will be on top of each relay above pin B2.

FIGURE 1. Dimensions and configuration - Continued.

REQUIREMENTS:

Contact data:

Arrangement: 2 form C.

Load ratings (relay case grounded).

High level: (100,000 cycles).

Resistive:

0.5 ampere at 28 V dc.

Inductive:

0.1 ampere at 28 V dc (200 mH).

Lamp: Not applicable.

Low level: 10-50  $\mu$ A at 10-50 mV dc or peak ac.

Intermediate current: Applicable.

Contact resistance or voltage drop:

Initial: 0.200 ohm maximum.

High level:

During life: Maximum of 10 percent of open circuit voltage.

After life: 0.300 ohm maximum.

Low level:

During life: 100 ohms maximum.

After life: 0.300 ohm maximum.

Intermediate current:

ⓑ During intermediate current: 3 ohms maximum.

ⓑ After intermediate current: 0.500 ohm maximum.

Contact bounce: 2.0 ms maximum (applicable to failure rate level "L").

Contact stabilization time: 2.5 ms maximum (applicable to failure rate levels "M", "P", and "R").

Overload (high level only):

Resistive: 2 times rated current.

Inductive: 2 times rated current.

ⓑ Neutral screen: Applicable.

Coil Data: See table I.

ⓑ Operate time (each coil): 6.0 ms maximum over temperature range with rated coil voltage.

Release time: Not applicable.

Electrical data:

Insulation resistance: 1,000 megohms minimum except the resistance between coil and case at high temperature shall be 100 megohms or greater. Measure at 100 V dc.

Dielectric withstanding voltage:

	Sea level V rms (60 Hz)	Altitude V rms (60 Hz)
Between case, frame, or enclosure and all contacts - - - - -	500	} 175 all terminals to case
Between case, frame, or enclosure and coil(s)- - - - -	350	
Between all contacts and coil(s) - - - - -	500	
Between open contacts in the set and reset positions- - - - -	350	
Between coils- - - - -	350	
Between contact poles- - - - -	500	

Environmental data:

Temperature range: -65°C to +125°C.

Magnetic interference: Not applicable.

Vibration (sinusoidal): MIL-STD-202, method 204. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

ⓑ Vibration (random): MIL-STD-202, method 214, test condition IG. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts (applicable to qualification and group C testing only).

Shock (specified pulse): MIL-STD-202, method 213, test condition C (100 g). Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

Coil life: Not applicable.

Resistance to soldering heat: Applicable.

Acceleration: 100 g.

Physical data:

Seal: Hermetic.

Terminals: See figure 1.

Terminal strength: 1.0 ±0.1 pound pull (453 grams).

ⓑ Solderability: Applicable.

Terminal twist test: Not applicable.

Dimensions and configuration: See figure 1.

Weight: 2.0 grams (0.07 ounce) maximum.

Minimum marking: Applicable.

## Life test requirements:

High level: 100,000 cycles.

- ⓑ Low level: 100,000 cycles plus 900,000 cycles mechanical life.

Part number: M39016/47 (dash number from table I and suffix letter designating failure rate level).

ⓑ TABLE I. Dash number and characteristics. 1/ 2/

Dash number <u>3/</u>	Coil voltage <u>4/</u> V dc		At 20°C		At +125°C
	Rated	Max	Coil resistance ohms ±15%	Specified pickup (latch/ reset) value (voltage) <u>5/</u> (V dc)	Specified pickup (latch/reset) value (voltage) (V dc) <u>5/</u>
001	5	7	65	2.5	3.5
002	12	14	375	6.3	9.0
003	24	28	1500	12.6	18.0

- 1/ WARNING: When latching relays are installed in equipment, the latch and reset coils should not be pulsed simultaneously. Coils should not be pulsed with less than the rated coil voltage. The nominal power sensitivity (rectangular pulses) is 2.0 millijoules at 5 milliseconds. The nominal coil voltage and the pulse width should be a minimum of three times the specified operate time of the relay.
- 2/ Relays previously tested or used above 10 mA resistive at 6 V dc maximum or peak ac open circuit shall not be used for low level applications.
- 3/ The suffix letter L, M, P, or R to designate the applicable failure rate level that 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 - - - - - 002M.
- 4/ CAUTION: Use of any voltage less than the rated voltage will compromise the operation of the relay.
- 5/ Allow 10 percent increase in maximum operate voltages after life tests.

## QUALIFICATION INSPECTION:

Qualification inspection and sample size: See table II.

Ⓑ TABLE II. Qualification inspection and sample size.

Single submission		Group submission
24 units plus 1 open unit for level L at C = 0 <u>1/</u>	M39016/47 -002	24 units plus 1 open unit for level L at C = 0 <u>1/</u>
33 units plus 1 open unit for level M at C = 0 <u>1/</u>		33 units plus 1 open unit for level M at C = 0 <u>1/</u>
Qualification inspection as applicable.	M39016/47 -001	2 units each part number, qualification inspection table, group II.
	M39016/47 -003	2 units, qualification inspection table, group II, and shock, vibration, acceleration, terminal strength, and seal.

1/ The number of units required for qualification testing will be increased as required in group V, table II, MIL-R-39016, if the relay manufacturer elects to test the number of units permitting one or more failures. Prior to performance of qualification inspection testing; the relay manufacturer shall preselect the sampling plan.

CONCLUDING MATERIAL

Ⓑ Custodians:  
 Army - ER  
 Navy - EC  
 Air Force - 85

Ⓑ User activity:  
 Air Force - 11

Preparing activity:  
 Navy - EC

Agent:  
 DLA - ES

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