

INCH-POUND

MIL-PRF-39016/55B
31 October 2006
SUPERSEDING
MIL-PRF-39016/55A
15 February 1991

PERFORMANCE SPECIFICATION SHEET

RELAY, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, DPDT,
LOW LEVEL TO 2 AMPERES (.200-INCH TERMINAL SPACING),
WITH INTERNAL DIODE FOR COIL TRANSIENT SUPPRESSION

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-39016.

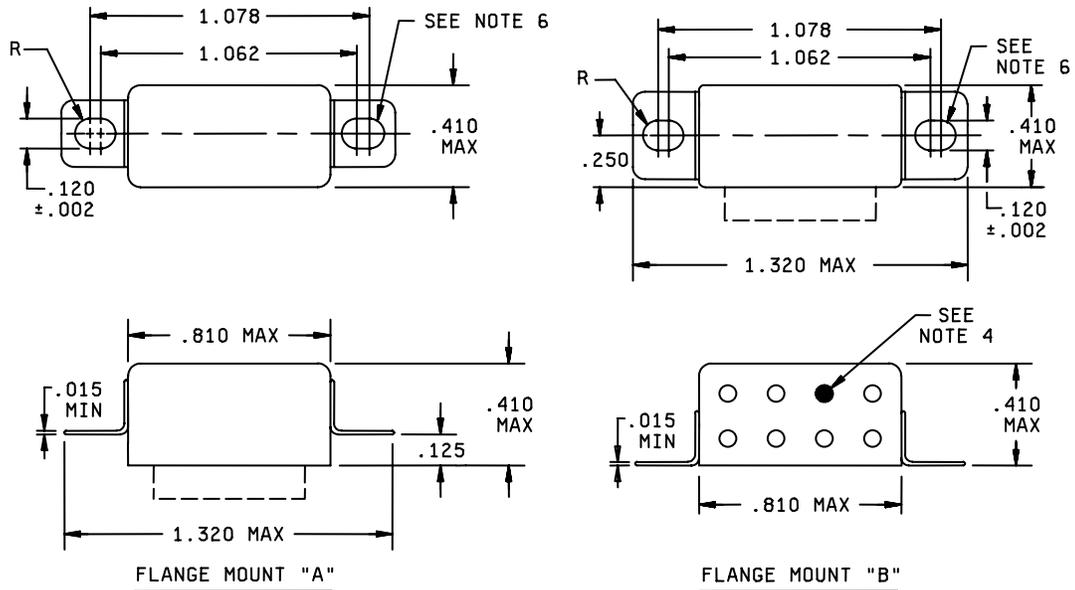


FIGURE 1. Dimensions and configuration.

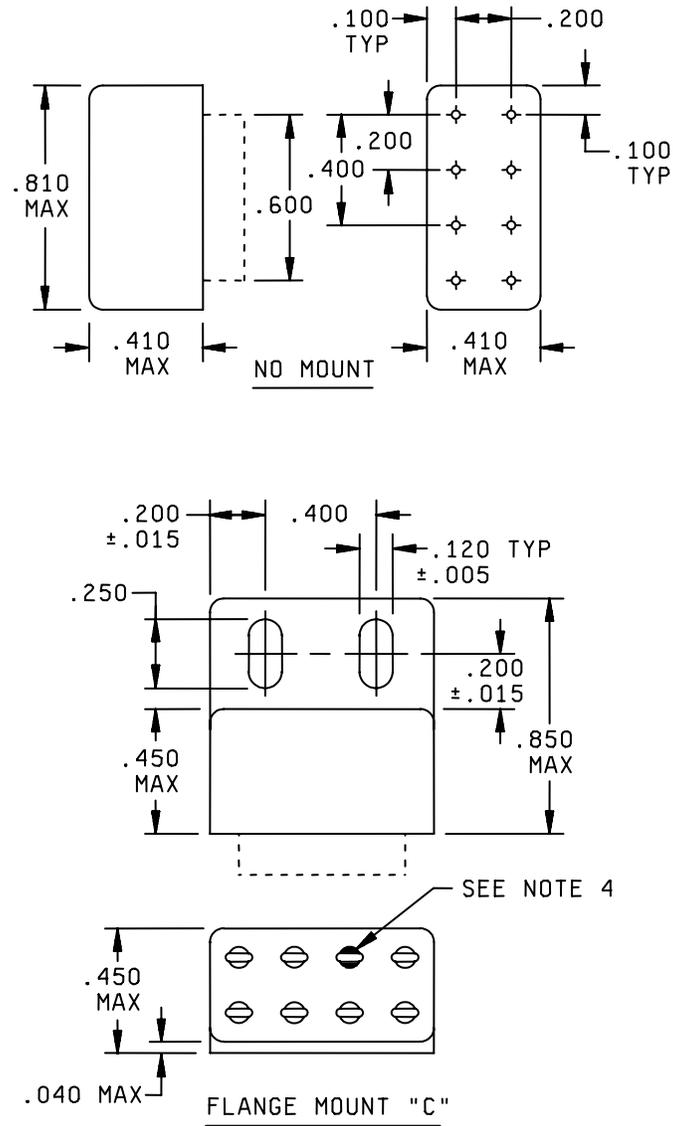
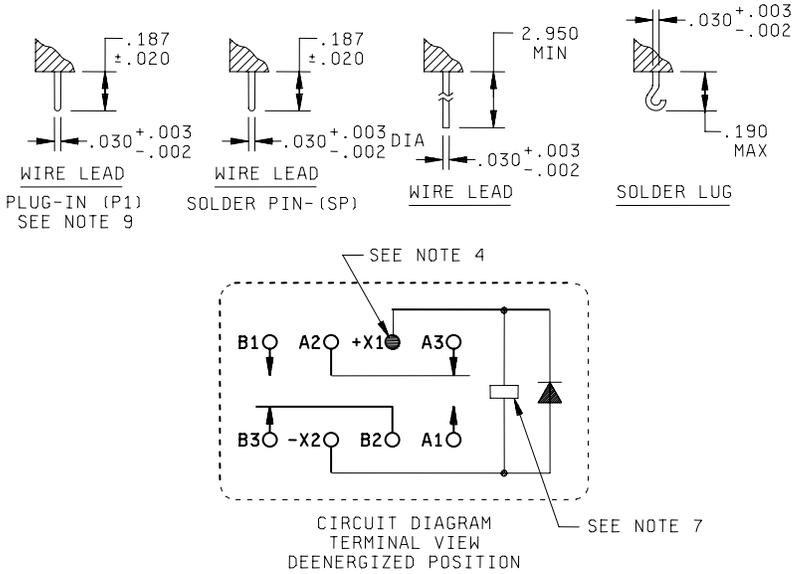


FIGURE 1. Dimensions and configuration - Continued.

MIL-PRF-39016/55B



Inches	mm	Inches	mm
.002	0.05	.200	5.08
.003	0.08	.250	6.35
.005	0.13	.310	7.87
.015	0.38	.400	10.10
.020	0.51	.410	10.41
.030	0.76	.600	15.24
.096	2.44	.810	20.57
.100	2.54	1.000	25.40
.120	3.05	1.062	26.97
.125	3.18	1.078	27.38
.137	3.48	1.180	29.97
.187	4.75	1.320	33.53
.190	4.83	2.950	74.93

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is ± 0.010 (0.25 mm).
4. Indicated terminal shall be marked with a contrasting bead.
5. Circuit diagram (including terminal designations) shall be marked on top if readable from the mounted position; otherwise, marking of the surface is optional.
6. Mounting screw head clearance shall be based on use of ".112 dia." fillister head screws.
7. Coil symbol shall be in accordance with MIL-STD-1285.
8. Mounting surface finish shall be compatible with aluminum (duralumin type) as defined by the compatible couples table of MIL-PRF-39016.
9. Finish: Finish shall provide the operational, environmental, and interface characteristics to provide a reliable interconnect to gold plated contacts. One system for gold plating that may be used is ASTM B488, type 3, class 1.25, knoop hardness shall be a minimum of 200, nickel underplating shall be a minimum of 50 to 150 microinches thick. The gold plating shall enable the product to meet the performance requirements of this specification and shall be approved by the qualifying activity.
10. Relays shall have a plus (+) symbol on the circuit diagram as shown.

FIGURE 1. Dimensions and configuration - Continued.

REQUIREMENTS:

Cleaning and small particle inspection: Applicable.

CONTACT DATA:

Load ratings:

High level (relay case grounded):

Resistive: 2 amperes at 28 V dc, 0.1 ampere at 115 V ac, (60 and 400 Hz).

Inductive: 0.5 ampere at 28 V dc with 0.200 henry inductance.

Lamp: 0.160 ampere at 28 V dc.

Low level: 10 μ A to 50 μ A at 10 mV to 50 mV dc or peak ac.

Intermediate current: Applicable.

Contact resistance or voltage drop:

High level:

Before life: 0.050 ohm maximum.

During life: Not more than 5 percent of open circuit voltage.

After life: 0.100 ohm maximum.

Low level:

Before life: 0.050 ohm maximum.

During life: 33 ohms maximum.

After life: 0.150 ohm maximum.

Intermediate current:

Before: 0.050 ohm maximum.

During: 1 ohm maximum.

After: 0.100 ohm maximum.

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

Contact stabilization time: 2.0 ms maximum (applicable to failure rate levels M, P, and R).

Overload (high level only): Two times rated current.

MIL-PRF-39016/55B

Coil data: See table I.

Operate time: 4 milliseconds maximum over temperature range with rated coil voltage.

Release time: 8 milliseconds maximum over temperature range from rated coil voltage.

Electrical data:

Insulation resistance: 10,000 megohms minimum (400 Hz load testing required for qualification only).

Dielectric withstanding voltage: 1/

	Sea level V rms (60 Hz)	Altitude V rms (60 Hz)
Between case, frame, or enclosure, and all contacts both in the energized and deenergized position- - - -	1,000	} 350 All terminals to case
Between case, frame, or enclosure and coil - - - - -	500	
Between all contacts and coil - - - - -	1,000	
Between open contacts in the energized and and deenergized positions - - - - -	500	
Between contact poles - - - - -	1,000	

Diode characteristics: 2/

Maximum negative transient: 1.0 volt.

Coil transient suppression: Applicable.

Semiconductor in-process screening: Applicable; visual inspection of semiconductors shall be in accordance with MIL-STD-750, method 2073 or method 2074.

Environmental data:

Temperature range: -65°C to +125°C.

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 only for qualification and group C testing.)

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.

Magnetic interference: Applicable.

Resistance to soldering heat: Applicable.

Acceleration: Applicable.

1/ Connect coil leads together to avoid damage to the diode.

2/ Warning: Reverse polarity on coil terminals will destroy diode.

MIL-PRF-39016/55B

Physical data:

Terminals: See figure 1 and table I.

Terminal strength: 3 ± 0.3 pounds pull.

Terminal solderability: Applicable.

Terminal twist test: Applicable to wire lead terminals.

Dimensions and configuration: See figure 1.

Weight: 13 grams (0.46 ounce) maximum.

Identification marking (full): Applicable.

Seal: Hermetic.

Life test requirements:

High level: 100,000 cycles.

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

Part or Identifying Number (PIN): M39016/55- (plus dash number from table I and suffix letter designating failure rate level as described in footnote 2/ of table I).

Qualification inspection:

Qualification inspection and sample size: See table II.

Qualification inspection (reduced testing) and sample size: See table III. If the relays produced for MIL-PRF-39016/55 are similar in construction and design to relays produced for MIL-PRF-39016/6 (except for the diodes and coils, as applicable), then reduced testing for qualification of MIL-PRF-39016/55 relays may be performed concurrent with or subsequent to successful qualification of MIL-PRF-39016/6.

TABLE I. Dash number and applicable characteristics. ^{1/}

Dash number ^{2/}				Mount	Coil voltage ^{5/} (V dc)		At 25°C				Over temperature range ^{3/}		
							Coil resistance Ohms ±10%	Speci- fied pickup voltage (V dc) (max) ^{3/}	Speci- fied hold voltage (V dc) ^{3/}	Speci- fied dropout voltage (V dc) ^{3/}	Speci- fied pickup voltage (V dc) (max)	Speci- fied hold voltage (V dc)	Speci- fied dropout voltage (V dc)
Wire lead (PI) ^{4/}	Solder lug	Wire lead (SP)	Wire lead		Rated	Max							
001 --- 008 ---	002 005 009 012	003 006 010 ---	004 007 011 ---	A B None C	26.5	32.0	700	13.5	8.0	1.5	18.0	14.0	1.0
013 --- 020 ---	014 017 021 024	015 018 022 ---	016 019 023 ---	A B None C	12.0	15.0	160	6.4	4.0	0.7	9.0	5.8	0.50
025 --- 032 ---	026 029 033 036	027 030 034 ---	028 031 035 ---	A B None C	6.0	7.5	40	3.2	2.0	0.35	4.5	2.9	0.25
037 --- 044 ---	038 041 045 048	039 042 046 ---	040 043 047 ---	A B None C	5.0	6.0	27	2.7	1.65	0.29	3.8	2.4	0.21

- ^{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 circuit, 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: -004L.
- ^{3/} Pickup, hold, and dropout voltages as shown are for test purposes only and are not to be used for design criteria.
- ^{4/} Solderability for plug-in relays is not applicable.
- ^{5/} Caution: The use of any coil voltage less than the rated coil voltage will compromise the operation of the relay.

MIL-PRF-39016/55B

TABLE II. Qualification inspection and sample size.

Single submission	Group submission	
33 units plus 1 open unit for level M at C = 0 ^{1/} Qualification inspection as applicable	M39016/55-002	33 units plus 1 open unit for level M at C = 0 ^{1/} Qualification inspection as applicable.
	M39016/55-019 M39016/55-012	2 units, qualification inspection table, Q1, Q2, and shock, vibration, acceleration, terminal strength, and seal.
	M39016/55-001 M39016/55-008	2 units, qualification inspection table, Q1, Q2, and shock and vibration.
	M39016/55-034 M39016/55-038	2 units, qualification inspection table, Q1, Q2

^{1/} The number of units required for qualification testing shall be increased as required in Q5, table II, MIL-PRF-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.

TABLE III. Qualification inspection (reduced testing) and sample size.

Examination or test
Q2 of qualification inspection table (2 units each coil voltage)
Q5 of qualification inspection table (2 units - M39016/55-009) (2 amperes at 28 V dc)
1 unsealed unit for internal examination (submitted with test report)

MIL-PRF-39016/55B

Referenced documents: In addition to MIL-PRF-39016, this document references the following:

MIL-PRF-39016/6	MIL-STD-1285
MIL-STD-202	ASTM B488
MIL-STD-750	

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:

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

Preparing activity:
DLA -CC

(Project 5945-2007-001)

Review activities:

Army - AR
Navy - AS, MC, OS, SH
Air Force - 19

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 <http://assist.daps.dla.mil>.