

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.

INCH-POUND

MIL-PRF-39016/55A
15 February 1991
 SUPERSEDING
 MIL-R-39016/55
 10 July 1990

PERFORMANCE SPECIFICATION SHEET

RELAY, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, DPDT,
 LOW LEVEL TO 2 AMPERES (0.200-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 the issue of the following specification listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation: MIL-R-39016.

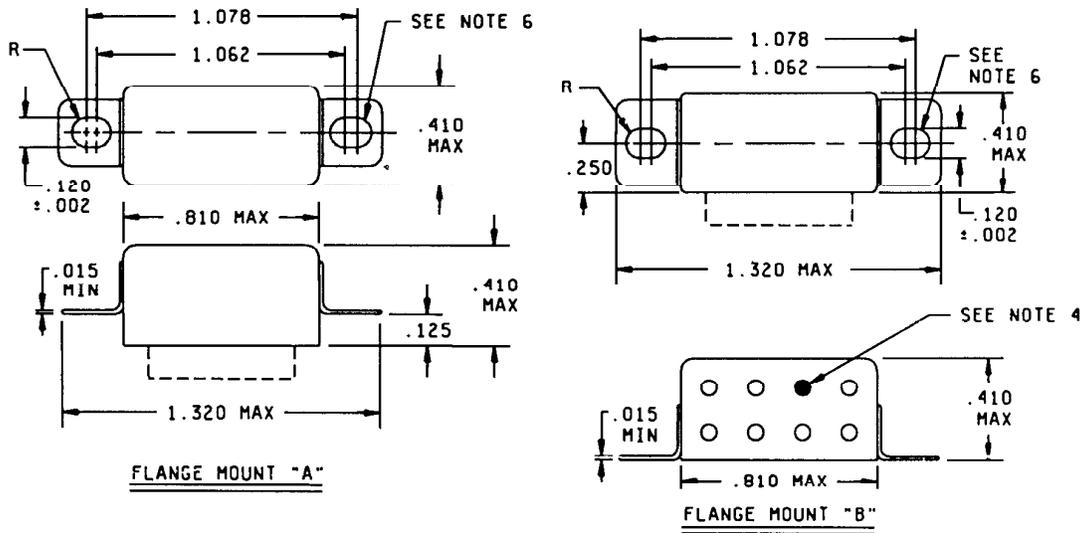


FIGURE 1. Dimensions and configuration

(A) denotes changes

INCH-POUND

MIL-R-39016/55A
15 February 1991
SUPERSEDING
MIL-R-39016/55
10 July 1990

MILITARY SPECIFICATION SHEET

RELAY, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, DPDT,
LOW LEVEL TO 2 AMPERES (0.200-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 the issue of the following specification
listed in that issue of the Department of Defense Index of Specifications
and Standards (DODISS) specified in the solicitation: MIL-R-39016.

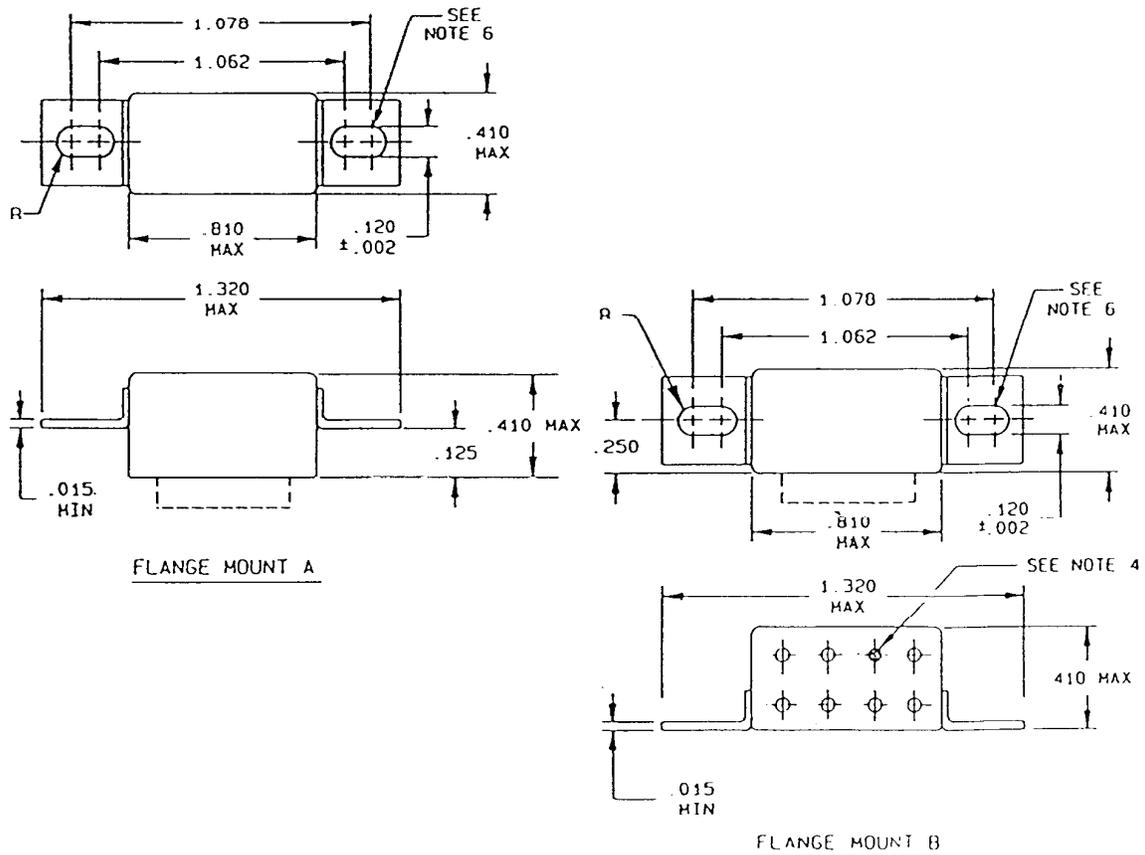


FIGURE 1. Dimensions and configuration.

(A) denotes changes

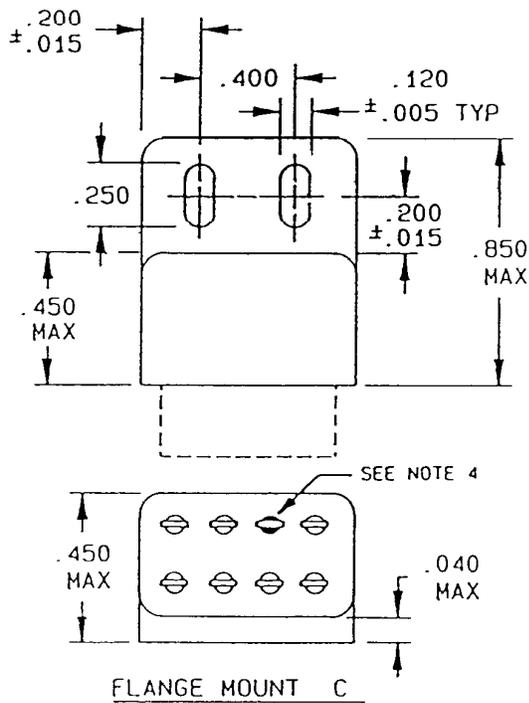
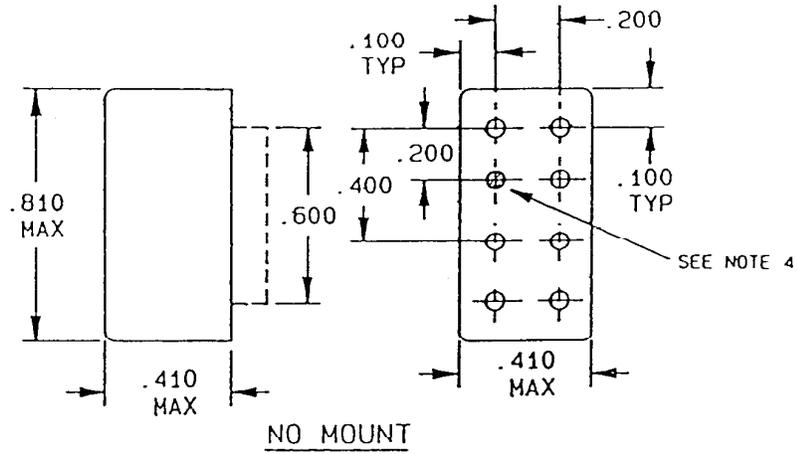
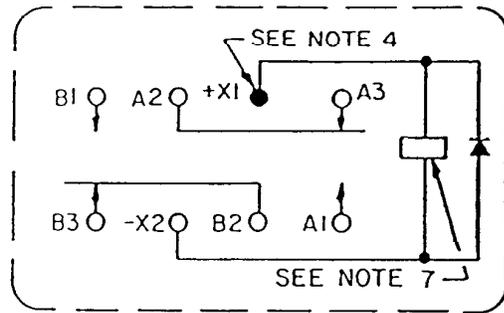
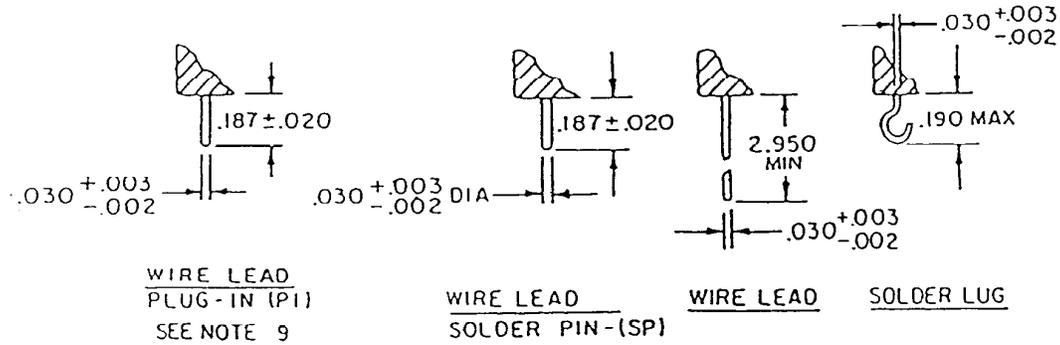


FIGURE 1. Dimensions and configuration - Continued.



CIRCUIT DIAGRAM
TERMINAL VIEW
DEENERGIZED POSITION

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 R 39016.
9. Finish shall be gold plate in accordance with MIL-G-45204, type II, class I, grade C, except that Knoop hardness shall be 130 to 240. Underplating shall be nickel, 50 to 150 microinches thick.
10. Relays shall have a plus (+) symbol on the circuit diagram as shown.

FIGURE 1. Dimensions and configuration - Continued.

MIL-R-39016/55A

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

Intermediate current: Applicable.

Contact resistance and 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 milliseconds maximum (applicable to failure rate levels M, P, and R).

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

MIL-R-39016/55A

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 positions - -	1,000	
Between case, frame, or enclosure and coil - - - - -	500	350
Between all contacts and coil- - - - -	1,000	All terminals to case
Between open contacts in the energized 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 1G. 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.)

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

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

MIL-R-39016/55A

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.

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 INSPECTIONS:

Qualification inspection and sample size: See table II.

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

TABLE I. Dash number and applicable characteristics. 1/

Dash number 2/					At +25°C						Over temperature 3/ range		
Wire lead (P1) 4/	Solder lug	Wire lead (SP)	Wire lead	Mount	Coil voltage 5/ (V dc)		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 drop- out voltage (V dc)
					Rated	Max							
001 --- 008	002 005 012	003 006	004 007	A B None C	26.5	32.0	700	13.5	8.0	1.5	18.0	14.0	1.0
013 --- 020	014 017 024	015 018	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	026 029 036	027 030	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	038 041 048	039 042	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 operations): 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-R-39016/55A

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, group I, group II, shock, vibration, acceleration, terminal strength, and seal.
	M39016/55-001 M39016/55-008	2 units, qualification inspection table, group I, group II, shock, and vibration.
	M39016/55-034 M39016/55-038	2 units, qualification inspection table, group I, group II.

1/ The number of units required for qualification testing shall be increased as required in group V, table II, MIL-R-39016, 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.

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

Examination or test
Group II of qualification inspection table (2 units each coil voltage)
Group V 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-R-39016/55A

CONCLUDING MATERIAL

Custodians:

Army - ER
Navy - EC
Air Force - 85

Review activities:

Army - AR
Navy - AS
Air Force - 99
DLA - ES

User activities:

Navy - MC, OS, SH
Air Force - 11, 19

Preparing activity:
Navy - EC

Agent:

DLA - ES

(Project 5945-0851)