

INCH-POUND

MIL-PRF-39016/36C
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SUPERSEDING
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PERFORMANCE SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, HERMETICALLY SEALED, 4PDT, LOW LEVEL TO 2 AMPERES (.150-INCH TERMINAL SPACING), LATCHING, WITH INTERNAL DIODES FOR COIL TRANSIENT SUPPRESSION AND REVERSE POLARITY PROTECTION

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.

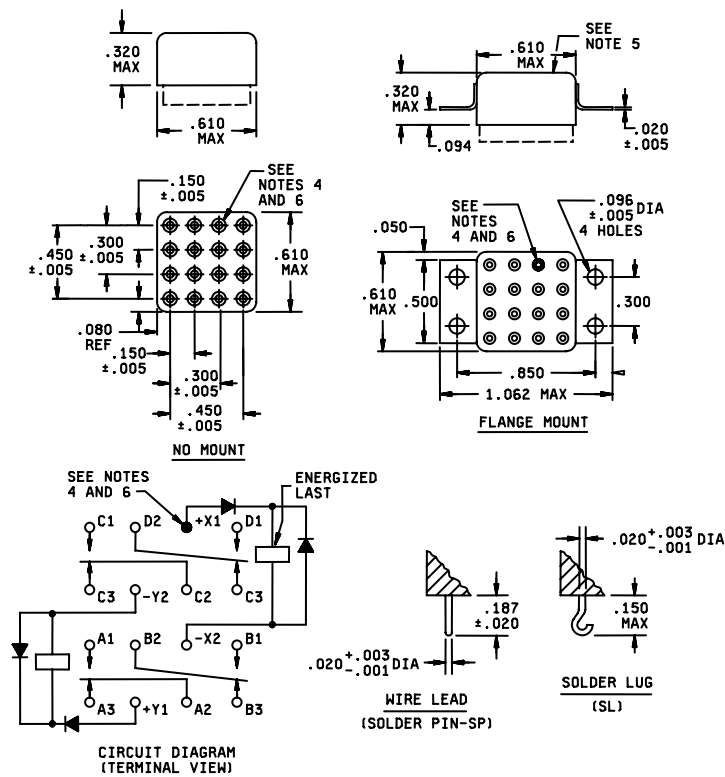


FIGURE 1. Configuration and circuit diagram.

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Inches	mm	Inches	mm
.001	0.03	.150	3.81
.002	0.05	.187	4.75
.003	0.08	.300	7.62
.005	0.13	.320	8.13
.020	0.51	.450	11.43
.050	1.27	.500	12.70
.080	2.08	.610	15.49
.094	2.39	.850	21.59
.096	2.44	1.062	26.97

NOTES:

1. Dimensions are in inches.
2. Unless otherwise specified, tolerance is ± 0.010 (0.25 mm).
3. Metric equivalents are given for general information only.
4. Terminal indicated shall be identified by a contrasting bead. Relay shall have (+) and (-) signs placed on the circuit diagram as shown above.
5. Circuit diagram marked on top of relay.
6. Energizing the indicated coil with the indicated polarity and voltage shall cause the relay contacts to assume the position shown.
7. Coil symbols are optional. See figure 1 of MIL-PRF-39016.
8. Terminal numbers in circuit diagram are for reference only. Numbers do not appear on relay.

FIGURE 1. Configuration and circuit diagram - Continued.

REQUIREMENTS:

Contact data:

Load ratings:

High level (relay case grounded):

Resistive: 2.0 ampere at 28 V dc. .125 ampere at 115 V ac (60 and 400 Hz). 0.5 ampere at 115 V ac (60 and 400 Hz) (case ungrounded).

Inductive: 0.5 ampere at 200 mH inductive at 28 V dc.

Lamp: 0.10 ampere at 28 V dc - Life test not required.

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:

Initial: 0.050 ohm maximum.

High level:

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

After life: 0.150 ohm maximum.

Low level:

During life: 33 ohms maximum.

After life: 0.150 ohm maximum.

Intermediate current:

During: 1 ohm maximum.

After: .300 ohm maximum.

Contact bounce: 2.0 milliseconds (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): 4 ampere resistive at 28 V dc. 1.0 ampere inductive at 28 V dc (ac not applicable).

Neutral screen: Applicable

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Coil data (each coil): (See table I).

Operate time (latch and reset): 4.0 ms maximum over temperature range with rated coil voltage.

Release time: Not applicable.

Electrical data:

Insulation resistance 1/: 10,000 megohms minimum, except the resistance between coil and case at high temperature shall be 1,000 megohms minimum.

Dielectric withstanding voltage: 1/

	Sea level V rms (60 Hz)	Altitude V rms (60 Hz)
Between case, frame, or enclosure, and all contacts ---	750	} 350 All terminals to case
Between case, frame, or enclosure and coils -----	500	
Between all contacts and coils -----	750	
Between open contacts in the latch and reset positions -----	500	
Between contact poles -----	750	
Between coils of dual coil relays -----	500	

Diode characteristics: 2/

Maximum negative transient: 1.0 volt.

Breakdown voltage: 100 V dc at 10 microamperes (μ A).

Maximum leakage current: 1 μ A at 50 V dc.

Coil transient suppression: Applicable

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

1/ Insulation resistance and dielectric withstanding voltage tests must always precede all other specified electrical measurements. Connect all coil terminals together to avoid damage to the diode.

2/ In all tables relating to qualification testing and group A testing, delete coil resistance and substitute the following tests: (Test each coil individually.) Diode breakdown and block integrity with applicable voltage applied to the relay coil circuit in the reverse direction, monitor leakage current with dc microammeter or oscilloscope. Leakage current shall not exceed the specified value.

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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 to qualification and group C testing only).

Shock (specified pulse): MIL-STD-202, method 213, test condition C (100G). 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:

Terminals: See figure 1 and table I.

Terminal strength:

Pull test: 1.5 ±0.2 pounds.

Bend test: Not applicable.

Solderability: Applicable.

Dimensions and configuration: See figure 1.

Weight: 7.6 grams (0.27 ounce) maximum.

Identification marking (full): Applicable.

Life test requirements:

High level: 100,000 cycles per relay.

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

Part or Identifying Number (PIN): M39016/36- (dash number from table I and suffix letter designating failure rate level).

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

Dash number 3/	Mount	Terminal	Coil voltage (V dc)		Coil resistance (Ref. only) ohms ±10% 5/	Max coil current (mA)	Min coil current (mA)	Specified pickup (latch/reset) value (voltage) (V dc) 6/	
			Rated 4/	Max				25°C	125°C
-002	No mount	Wire lead (SP)	12.0	14.5	145	88.12	68.97	6.2	8.6
-003	No mount	Wire lead (SP)	26.5	35.0	975	29.63	23.78	14.5	19.0
-004	Flange	Solder lug	6.0	7.2	37	165.17	122.85	3.6	4.8
-005	Flange	Solder lug	12.0	14.5	145	88.12	68.97	6.2	8.6
-006	Flange	Solder lug	26.5	35.0	975	29.63	23.78	14.5	19.0

- 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 circuits are not recommended for subsequent use in low level applications.
- 2/ **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.
- 3/ 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, 001L - - - 006R.
- 4/ **CAUTION:** Use of any coil voltage less than the rated voltage will compromise the operation of the relay.
- 5/ Coil resistance not directly measurable at relay terminals. When rated voltage is applied to the coil terminals the coil circuit current must be within the limits shown. Measure at 25°C at nominal voltage for 5 seconds maximum.
- 6/ A 10 percent increase in latch and reset voltages is allowed during and after rated life.

TABLE II. Qualification inspection and sample size.

Single submission	Group submission	
24 units plus 1 open unit for level L at C = 0 1/ 33 units plus 1 open unit for level M at C = 0 1/ Qualification inspection as applicable.	M39016/36-006	24 units plus 1 open unit for level L at C = 0 1/ 33 units plus 1 open unit for level M at C = 0 1/ Qualification inspection as applicable.
	M39016/36-002	2 units qualification inspection table, Q1.
	M39016/36-001	2 units, qualification inspection table, Q1, and terminal strength, resistance to soldering heat, and seal.

- 1/ The number of units required for qualification testing shall be increased as required in Q5, MIL-PRF-39016, if the relay manufacturer elects to test the number of units permitting one or more failures. Prior to performance of qualification testing; the relay manufacturer shall preselect the sample size.

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

MIL-STD-202
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 5945-1290-000)

Review activities:

Army - AR
Navy - AS, OS, SH, MC
Air Force - 19, 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 <http://assist.daps.dla.mil>.