

INCH-POUND

MIL-R -39016/40G  
25 October 2005  
SUPERSEDING  
MIL-R-39016/40F  
4 June 1992

MILITARY SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, 4PDT, LOW LEVEL  
TO 2.0 AMPERES (0.100-INCH TERMINAL SPACING)

Inactive for new design after 29 January 1991.  
For new designs refer to MIL-PRF-39016/14.

This specification sheet is approved for use by all Departments  
and Agencies of the Department of Defense.

The complete requirements for acquiring the relays described herein shall  
consist of this specification sheet and the latest issue of MIL-PRF-39016.

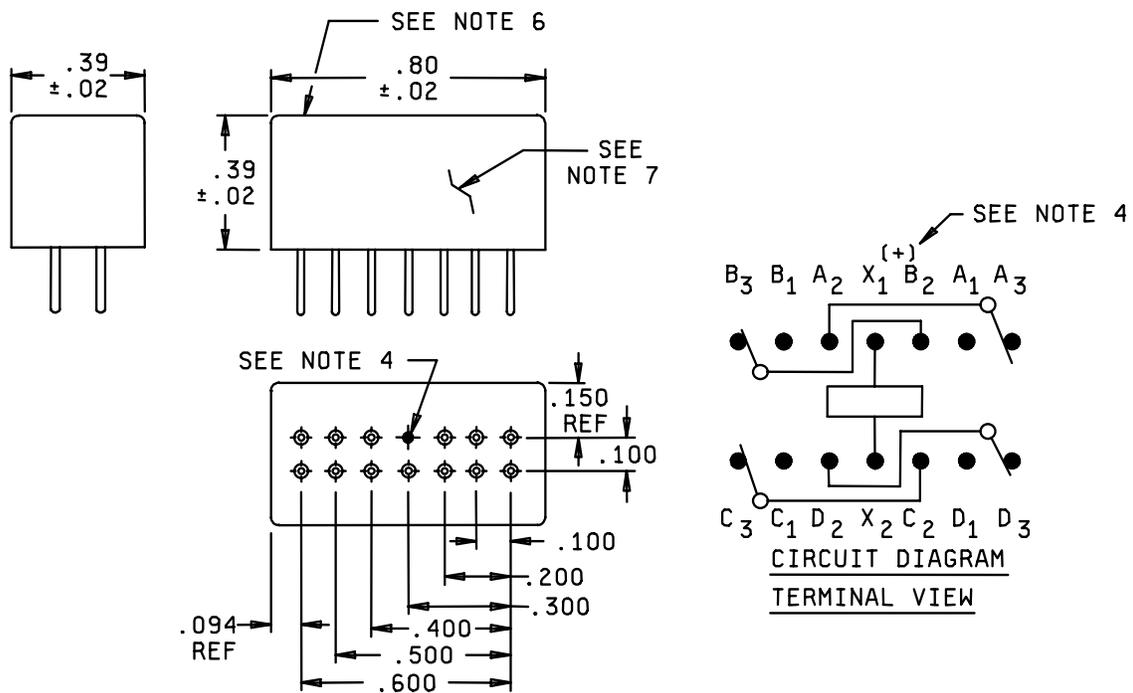


FIGURE 1. Dimensions and configuration.

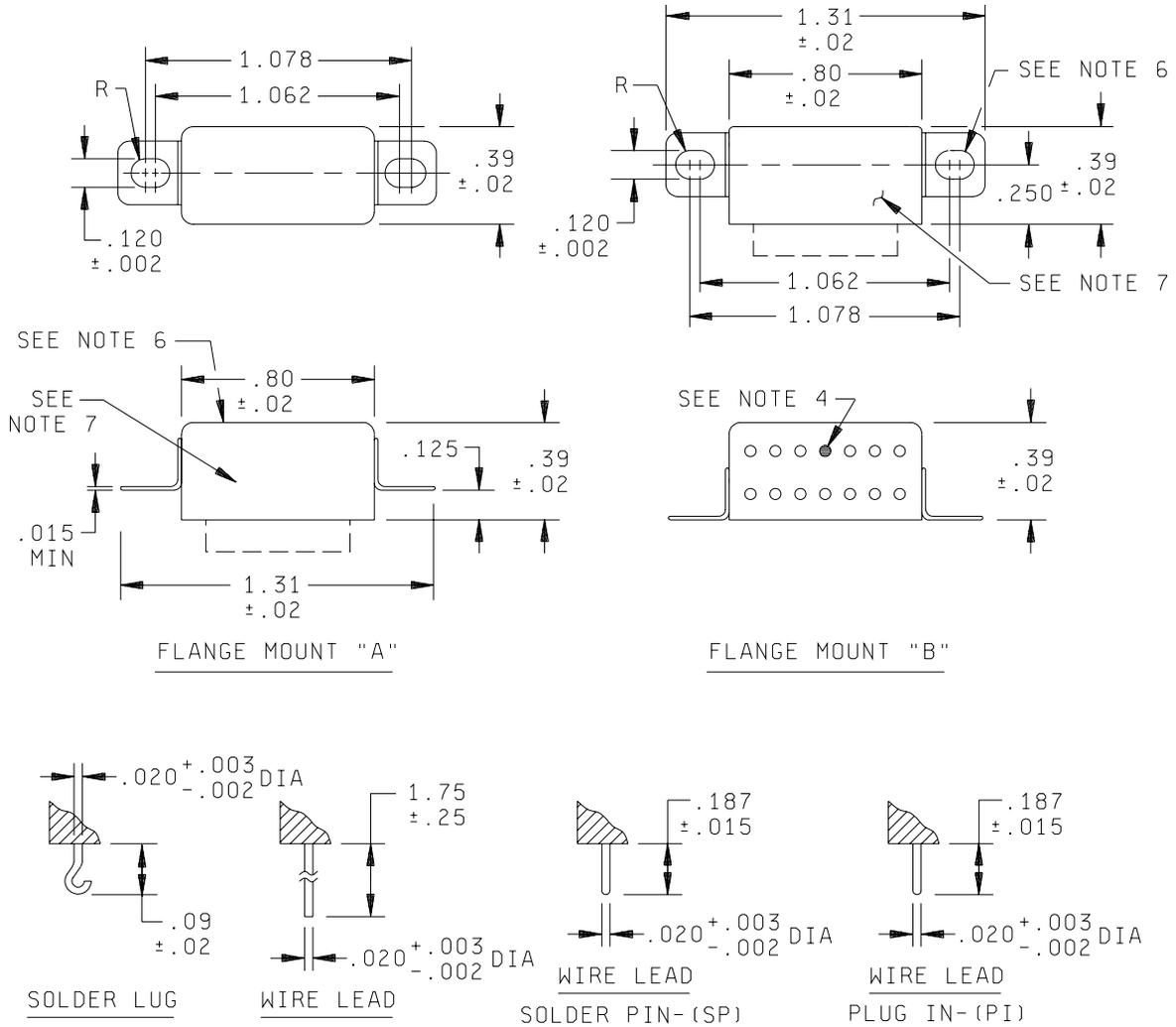


FIGURE 1. Dimensions and configuration - Continued.

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Inches	mm	Inches	mm
.002	0.05	.200	5.08
.003	0.08	.250	6.35
.005	0.13	.300	7.62
.015	0.38	.390	9.91
.020	0.51	.400	10.16
.090	2.29	.500	12.70
.094	2.39	.600	15.24
.100	2.54	.800	20.32
.110	2.79	1.062	26.97
.120	3.05	1.078	27.38
.125	3.18	1.310	33.27
.150	3.81	1.750	44.45
.187	4.75		

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. X1 terminal shall be identified with a contrasting bead. Relays which require coil polarity observance shall have a plus (+) sign placed on the schematic diagram as shown.
5. Shape of lug (solder) terminals is optional.
6. Schematic diagram shall be marked on this surface.
7. Identification marking shall be marked on this surface.
8. Terminal numbers in circuit diagram are for reference only. Numbers shall not appear on relay.
9. Wire lead, plug-in (PI), shall provide the operational, environmental, and interface characteristics to provide a reliable interconnect to gold-plated contacts. Wire leads shall be gold plated. 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.

FIGURE 1. Dimensions and configuration - Continued.

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REQUIREMENTS:

CONTACT DATA:

Load ratings:

High level (relay case grounded):

Resistive: 2 amperes at 28 V dc maximum; 0.3 ampere at 115 V ac, (60 and 400 Hz). 400 Hz life test not required for qualification testing.

Inductive: 0.75 ampere maximum at 28 V dc maximum with 200 millihenries minimum.

Lamp: 0.200 ampere at 28 V dc.

Low level: 10 to 50  $\mu$ A at 10 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: 0.100 ohm maximum.

Low level:

During life: 50 ohms maximum.

After life: 0.150 ohm maximum.

Intermediate current:

During intermediate current: 3 ohms maximum.

After intermediate current: .100 ohm maximum.

Overload (high level only):

Resistive: Two times rated current.

COIL DATA: (See table I).

Operate time: 7 ms maximum, inclusive of bounce, over temperature range with rated coil voltage.

Release time: 7 ms maximum, inclusive of bounce, over temperature range from rated coil voltage.

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ELECTRICAL DATA:

Insulation resistance: 1,000 megohms minimum, except the resistance between coil and case at high temperature shall be 500 megohms, or greater.

Dielectric withstanding voltage:

	Sea level V rms (60 Hz)	Altitude V rms (60 Hz)
Between case, frame, or enclosure and all contacts in the energized and de-energized positions.	500	350
Between case, frame, or enclosure and coils.	500	All terminals to case
Between all contacts and coils.	500	
Between open contacts in the energized and de-energized positions.	350	
Between contact poles.	500	

ENVIRONMENTAL DATA:

Temperature range: -65°C to +125°C.

Vibration (sinusoidal): MIL-STD-202, method 204 (15 g, 10 to 2,000 Hz). 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 IB. 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 μs maximum for closed contacts, and 1 μs maximum closure for open contacts.

Magnetic interference: Applicable.

Resistance to soldering heat: Applicable, except for plug-in relays.

Acceleration: 100 g.

PHYSICAL DATA:

Termination: See figure 1 and table I.

Solderability: Applicable, except for plug-in terminals.

Terminal strength: Applicable (1.0 ±0.3 pounds pull).

Dimensions and configuration: See figure 1.

Weight: 0.35 ounce maximum.

Identification marking (full): Applicable, except marking surface for date code is optional.

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LIFE TEST REQUIREMENTS:

Intermediate current: 50,000 cycles.

Electrical: 100,000 cycles.

Mechanical: 1,000,000 cycles.

Part or Identifying Number (PIN): M39016/40 - (plus dash number from table I).

TABLE I. Dash number and characteristics. <sup>1/</sup>

Dash number				Mounting	Coil voltage V dc		Coil resist- ance (±10%)  (+25°C) ohms	Over temperature range		
Terminals					Rated <sup>3/</sup>	Max		Speci- fied pickup value voltage (V dc)	Speci- fied hold value voltage (V dc)	Speci- fied dropout value (voltage) (V dc)
Solder lug	Wire lead (SP) <sup>2/</sup>	Wire lead	Wire lead (PI)							
-001	-007	-013	-019	Flange A	26.5	32.0	390	18.0	14.0	1.2
-002	-025	-014	---	Flange B						
---	-008	-028	-020	No mount						
-003	-009	-015	-021	Flange A	12.0	15.0	100	9.0	5.8	0.6
-004	-026	-016	---	Flange B						
---	-010	-029	-022	No mount						
-005	-011	-017	-023	Flange A	6.0	8.0	25	4.5	2.9	0.3
-006	-027	-018	---	Flange B						
---	-012	-030	-024	No mount						

<sup>1/</sup> 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 not recommended for subsequent use in low level applications.

<sup>2/</sup> CAUTION: Solder pin relays are not intended for plug-in socket use.

<sup>3/</sup> CAUTION: The use of any coil voltage less than the rated voltage will compromise the operation of the relay.

QUALIFICATION INSPECTION:

Qualification inspection and sample size: See table II.

TABLE II. Qualification inspection and sample size. 1/

Single submission	Group submission	
50 units plus 1 open unit. One failure allowed.  Qualification inspection as applicable	M39016/40-001	50 units plus 1 open unit. One failure allowed.  Qualification inspection as applicable
	M39016/40-009 M39016/40-024	2 units each PIN, qualification inspection table, Q2. No failures allowed
	M39016/40-014	2 units, qualification inspection table, Q2, and shock, vibration, acceleration, terminal strength, and seal.

SUPERSESSION DATA: See table III.

TABLE III. Supersession data.

Superseded PIN M5757/90-	New PIN M39016/40-		Superseded PIN M5757/90-	New PIN M39016/40-
001 and 002	001		025 and 026	013
003 and 004	002		027 and 028	014
005 and 006	003		029 and 030	015
007 and 008	004		031 and 032	016
009 and 010	005		033 and 034	017
011 and 012	006		035 and 036	018
013 and 014	025		037 and 038	007
015 and 016	008		039 and 040	009
017 and 018	026		041 and 042	011
019 and 020	010		043 and 044	028
021 and 022	027		045 and 046	029
023 and 024	012		047 and 048	030

VERIFICATION REQUIREMENTS:

Groups B and C not required. Group A required. The qualifying activity shall be notified of any design and/or construction changes and shall impose additional testing requirements as necessary.

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

ASTM B488  
MIL-PRF-39016/14  
MIL-STD-202

Changes from previous issue: Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

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Custodians:

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

Preparing activity:

DLA - CC

Review activities:

Army - AT, AV, CR4  
Navy - AS, OS, SH

(Project 5945-1321)

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>.