

INCH-POUND

MIL-PRF-39016/45E
23 April 2013
SUPERSEDING
MIL-PRF-39016/45D
26 February 2007

PERFORMANCE SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, DPDT,
LOW LEVEL TO 2 AMPERES (LATCHING)

Inactive for new design after 5 November 2001.

This specification sheet 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](#).

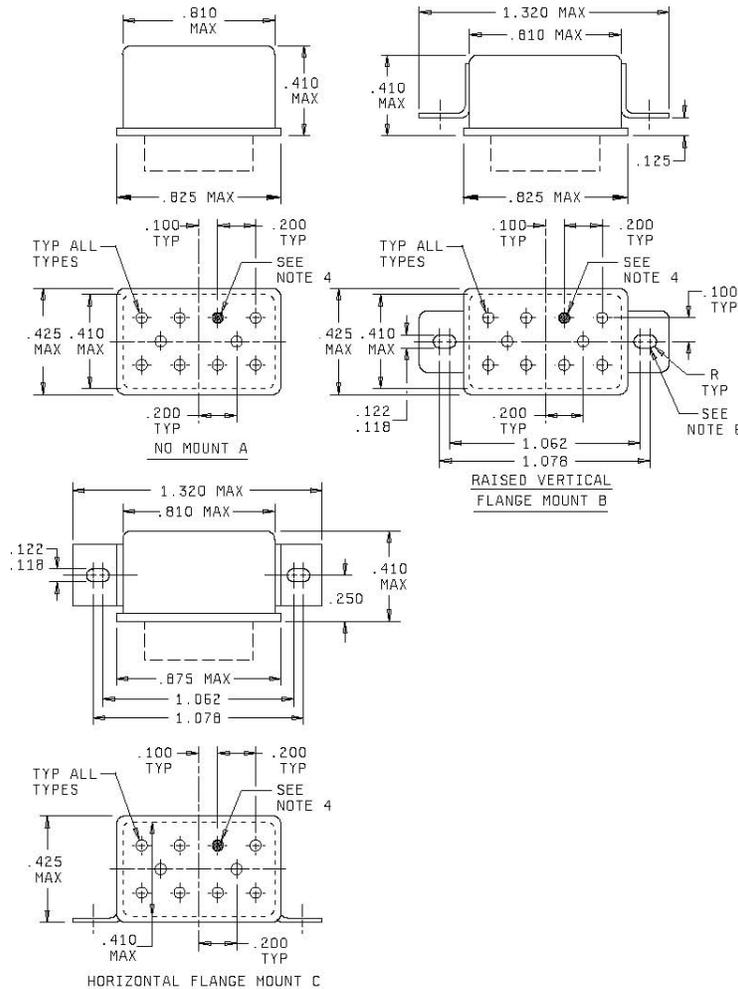
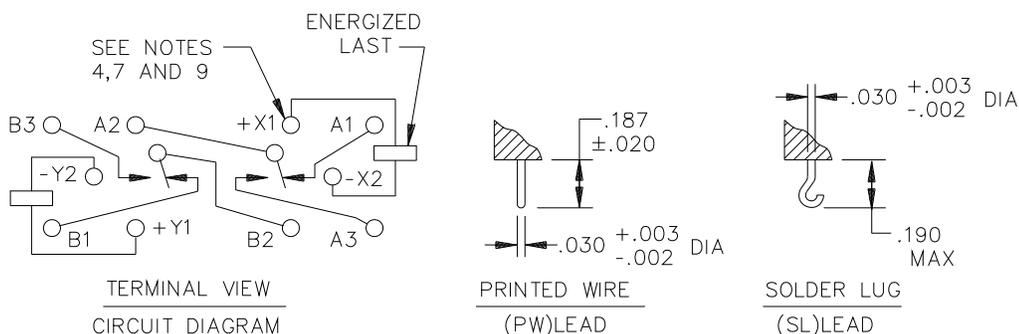


FIGURE 1. Dimensions and configuration.

MIL-PRF-39016/45E



Inches	mm	Inches	mm
.002	0.05	.250	6.35
.003	0.08	.400	10.16
.015	0.38	.410	10.41
.020	0.51	.412	10.46
.030	0.76	.455	11.45
.100	2.54	.600	15.24
.120	3.05	8.10	20.57
.125	3.18	1.062	26.97
.187	4.75	1.078	27.38
.190	4.83	1.320	33.53
.200	5.08	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 $\pm .010$ (0.25 mm).
4. Terminal indicated shall be identified by a contrasting bead. Relays shall have (+) and (-) signs placed on the circuit diagram as shown.
5. Coil symbol is optional in accordance with MIL-STD-1285.
6. Mounting screw head clearances based on use of No. 4 fillister head screws.
7. When relay enclosure has side mounting hardware, the contrasting header bead shall be located on the opposite side from the mounting hardware.
8. Mounting surface finish shall be compatible with aluminum (duralumin type) as defined by MIL-STD-889.
9. Energizing the indicated coil with proper polarity and voltage shall cause the relay contacts to assume the position shown.
10. Terminal numbers in circuit diagram are for reference only. Numbers do not appear on relay.

FIGURE 1. Dimensions and configuration - Continued.

REQUIREMENTS:

CONTACT DATA:

Load ratings:

High level (relay case grounded), resistive:

Resistive: 2.0 ampere at 28 V dc; 0.150 ampere at 115 V ac, 60 and 400 Hz.

Inductive: 0.75 ampere at 28 V dc with 200 millihenries 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 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: 0.100 ohm maximum.

Contact stabilization time: 5 milliseconds (ms) maximum. (Applicable to failure rate levels "M", "P", and "R").

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

Neutral screen: Applicable.

COIL DATA: (See [table I](#)).

Duty rating: Continuous.

Operate and bounce time: 7 ms maximum over temperature range with rated coil voltage.

Release time: Not applicable. Coil life: Not applicable.

ELECTRICAL DATA: [1/](#)

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.	1,000	350 All terminals to case
Between case, frame, or enclosure and coils.	500	
Between all contacts and coils.	1,000	
Between open contacts in the energized and de-energized positions.	500	
Between coils	500	
Between contact poles.	1,000	

ENVIRONMENTAL DATA:

Temperature range: -65°C to +125°C.

Vibration (sinusoidal): [MIL-STD-202](#), method 204, test condition D (except frequency shall be 10 to 2,500 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 IG. Contact chatter shall not exceed 10 microseconds maximum for closed contacts, and 1 microsecond maximum closure 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's). 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.

Salt spray (corrosion): Applicable.

[1/](#) (For qualification and group C tests only). During insulation resistance and dielectric withstanding voltage tests, the relay shall be latched in each of the two positions.

PHYSICAL DATA:

Terminals: See [figure 1](#) and [table I](#).

Terminal strength: 3 ± 0.3 pounds pull.

Solderability: Applicable.

Dimensions and configurations: See [figure 1](#).

Weight: 13 grams (0.46 ounce) maximum.

Seal: Hermetic.

Identification marking (full): Applicable.

LIFE TEST REQUIREMENTS:

High level: 100,000 cycles.

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

Part of Identifying Number (PIN): M39016/45 - (dash number from [table I](#) and suffix letter designation failure rate level).

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

Dash numbers 3/		Mount	Coil voltage (V dc) 4/		At 25°C			Over temperature range	
Solder lug	Printed wire (PW) .187 ±.020		Rated	Max	Coil resist- ance (ohms ±10%)	Specified pickup (latch/reset) voltage value (V dc)		Specified pickup (latch/reset) voltage value (V dc)	
						Max	Min	Max	Min
001 003 005	002 004 006	A B C	5.0	6.7	45	2.7	1.6	3.8	1.0
007 009 011	008 010 012	A B C	6.0	8.0	63	3.25	2.0	4.5	1.3
013 015 017	014 016 018	A B C	12.0	16.0	254	6.5	4.0	9.0	2.6
019 021 023	020 022 024	A B C	26.5	32.0	1,000	13.0	8.0	18.0	5.2
025 027 029	026 028 030	A B C	48.0	64.0	3,800	26.0	16.0	36.0	10.4

- 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 nominal coil voltage and the pulse width should be a minimum of three times the specified operate time of the relay. If these conditions are not followed, it is possible for the relay to be in the magnetically neutral position.
- 2/ 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.
- 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 - - - - - - - - - -012R.
- 4/ CAUTION: The use of any coil voltage less than the rated coil 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
20 units plus 1 open unit for level L at C = 0 ^{1/}	M39016/45-021	20 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/}		33 units plus 1 open unit for level M at C = 0 ^{1/}
Qualification inspection as applicable	M39016/45-010	Qualification inspection as applicable.
	M39016/45-003	2 units, qualification inspection table, Q2, and shock, vibration, acceleration, terminal strength, and seal.
	M39016/45-009	2 units, qualification inspection table, Q2. 1 unsealed sample unit.
	M39016/45-015	
	M39016/45-027	

^{1/} The number of units required for qualification testing will 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 inspection testing, the relay manufacturer shall preselect the sampling plan.

Group B and C tests may be suspended with qualifying activity approval. The qualifying activity shall be notified of any design and/or construction changes and shall impose additional testing requirements as necessary.

SUPERSESSION DATA: See [table III](#).

TABLE III. Supersession data.

Inactive PIN M5757/76-	New PIN ^{1/} M39016/45-
001	008
002	014
003	020
004	026
013	009
014	015
015	021
016	027
017	011
018	017
019	023
020	029

^{1/} Complete part number shall contain suffix letter L, M, P, or R to designate failure rate level (see ^{3/} in [table I](#)). A part with any failure rate supersedes the applicable MIL-R-5757 part.

MIL-PRF-39016/45E

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.

Referenced documents. In addition to [MIL-PRF-39016](#), this document references the following:

[MIL-STD-202](#)
[MIL-STD-889](#)
[MIL-STD-1285](#)
[MIL-R-5757](#)

Custodians:

Army - CR
Navy - EC
Air Force – 85
DLA - CC

Preparing activity:
DLA - CC

(Project 5945-2013-022)

Review activities:

Army - AR, AT, AV, CR4, MI, SM
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 <https://assist.dla.mil/>.