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

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

Inactive for new design after 2 November 2018.

FIGURE 1. Dimensions and configuration.
FIGURE 1. Dimensions and configuration - Continued.
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 identified 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 "0.112 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: 2.0 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 µA to 50 µA 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: 33 ohms maximum.
  After: 0.150 ohm maximum.

Intermediate current:
  Before: 0.050 ohm maximum.
  During: 1 ohm maximum.
  After: 0.100 ohms maximum.

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

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

Overload (high level only): Two times rated current.
COIL DATA: See table 1.

Operate time: 4.0 milliseconds maximum over temperature range with rated coil voltage.

Release time: 8.0 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/

<table>
<thead>
<tr>
<th></th>
<th>Sea level V rms (60 Hz)</th>
<th>Altitude V rms (60 Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between case, frame, or enclosure and all contacts both in the energized and de-energized position</td>
<td>1,000</td>
<td>350</td>
</tr>
<tr>
<td>Between case, frame, or enclosure and coil</td>
<td>500</td>
<td>All terminals to case</td>
</tr>
<tr>
<td>Between all contacts and coil</td>
<td>1,000</td>
<td></td>
</tr>
<tr>
<td>Between open contacts in the energized and de-energized positions</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Between contact poles</td>
<td>1,000</td>
<td></td>
</tr>
</tbody>
</table>

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-202-204. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts.

Vibration (random): MIL-STD-202-214, 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).


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.
PHYSICAL DATA:

Terminals: See figure 1 and table I.

Terminal strength: $3 \pm 0.3$ pounds pull.

Terminal solderability: Applicable.

Terminal twist test: Applicable to wire lead terminals.

Dimensions and configurations: 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 cycles mechanical life.

PART OR IDENTIFY 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.

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>
<thead>
<tr>
<th>Wire lead (PI)</th>
<th>Solder lug</th>
<th>Wire lead (SP)</th>
<th>Wire lead</th>
<th>Dash number</th>
<th>Mount</th>
<th>Coil voltage V dc 5/</th>
<th>At +25°C</th>
<th>Over temperature range 3/</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>001</td>
<td>A</td>
<td>26.5</td>
<td>32.0</td>
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<tr>
<td>008</td>
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<td></td>
<td></td>
<td>022</td>
<td>None C</td>
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<td>040</td>
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<td>A</td>
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<td>6.0</td>
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<td>045</td>
<td>046</td>
<td>047</td>
<td>048</td>
<td>B</td>
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</tbody>
</table>

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.
TABLE II. Qualification inspection and sample size.

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

1/ The number of units required for qualification testing will 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.

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

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

MIL-STD-750  MIL-STD-1285  ASTM-B488

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.

Custodians:
Army - CR  Navy - EC  Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

Review activities:

(Project 5945-2019-001)
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/.