DEFENSE LOGISTICS AGENCY
DEFENSE SUPPLY CENTER, COLUMBUS
3990 EAST BROAD STREET
COLUMBUS, OH 43216-5000

IN REPLY
REFER TO DSCC-VAT 17 June 2004

MEMORANDUM FOR MILITARY/INDUSTRY DISTRIBUTION

SUBJECT: Proposed Drafts of MIL-PRF-39016 Specification Sheets

The initial drafts of the following documents are now available for viewing and downloading from the DSCC-VA Web site:

Specification Sheet	Project #
MIL-PRF-39016/7G	5945-1246
MIL-PRF-39016/8G	5945-1247
MIL-PRF-39016/9J	5945-1248
MIL-PRF-39016/10G	5945-1249
MIL-PRF-39016/11G	5945-1250
MIL-PRF-39016/12G	5945-1251
MIL-PRF-39016/13J	5945-1252
MIL-PRF-39016/15K	5945-1253
MIL-PRF-39016/16G	5945-1254
MIL-PRF-39016/20J	5945-1255
MIL-PRF-39016/21G	5945-1256

Specification Sheet	Project #
MIL-PRF-39016/23F	5945-1257
MIL-PRF-39016/24F	5945-1258
MIL-PRF-39016/25F	5945-1259
MIL-PRF-39016/26F	5945-1260
MIL-PRF-39016/27F	5945-1261
MIL-PRF-39016/28F	5945-1262
MIL-PRF-39016/29G	5945-1263
MIL-PRF-39016/30F	5945-1264
MIL-PRF-39016/35C	5945-1265
MIL-PRF-39016/41E	5945-1266
MIL-PRF-39016/43E	5945-1267

http://www.dscccols.com/Programs/MilSpec
or
http://www.dscc.dla.mil/Programs/MilSpec/DocSearch.asp

The proposed drafts of the documents are forwarded for your review and comment. The proposed changes reflect updates as required by MIL-STD-961, standardizing the terminology for the mounting pads, deletion of the particle impact noise (PIND), incorporation of previous amendments, and correcting editorial errors.

If these documents are of interest to you, please submit your typed comments or suggestions using electronic mail or by letter. Comments may be resubmitted if it is believed that insufficient consideration has been given to previous comments. Please provide additional justification for these items. Comments or suggested changes that are not editorial in nature should include justification. Industrial activities should indicate whether they are commenting from the standpoint of a "User" or "Manufacturer." Military review activities should forward comments to their custodians in sufficient time to allow for consolidating the departmental reply. All Navy review activities are requested to send their comments to this center in lieu of the Navy - EC custodian. All agencies, industry, and coordinated custodian comments should be sent to this center. Comments originating from the military departments must be identified as either "Essential" or "Suggested." Essential comments, which must be accepted or withdrawn, should be supported by test data unless they obviously require no data.

Comments should be returned to this Center no later than 45 days from the date of this letter. If no response is received by the specified date, it is assumed that you concur with the document. Any further coordination concerning this document will be circulated only to firms and organizations that furnish comments or reply that they have an interest.

If there are any questions, please contact Mr. Jim Crum, by electronic mail at james.crum@dla.mil (preferred method of notification); by telephone at commercial 614-692-0542, DSN 850-0542; by facsimile 614-692-6939; or by mail at Defense Supply Center Columbus, Electronic Components Team, DSCC-VAT, P.O. Box 3990, Columbus, OH 43216-5000.

Signature on File

KENDALL A. COTTONGIM
Chief
Electronic Components Team

22 Attachments

NOTE: This draft, dated 17 June, 2004 prepared by DLA-CC has not been approved and is subject to modification.
DO NOT USE FOR ACQUISITION PURPOSES. (Project # 5945-1259)

INCH-POUND

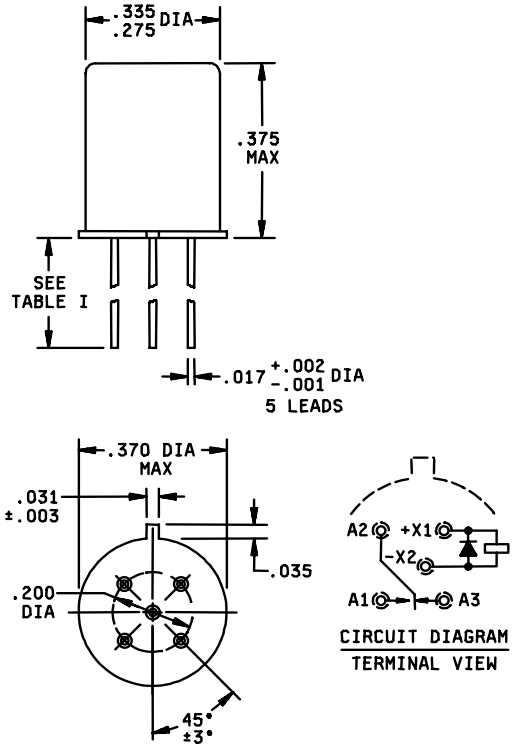
MIL-PRF-39016/25F
DRAFT
SUPERSEDING
MIL-PRF-39016/25E
20 July 1988

PERFORMANCE SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, SPDT, LOW LEVEL TO 1.0 AMPERE (SENSITIVE, 40 MILLIWATTS) WITH INTERNAL DIODE FOR COIL TRANSIENT SUPPRESSION

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

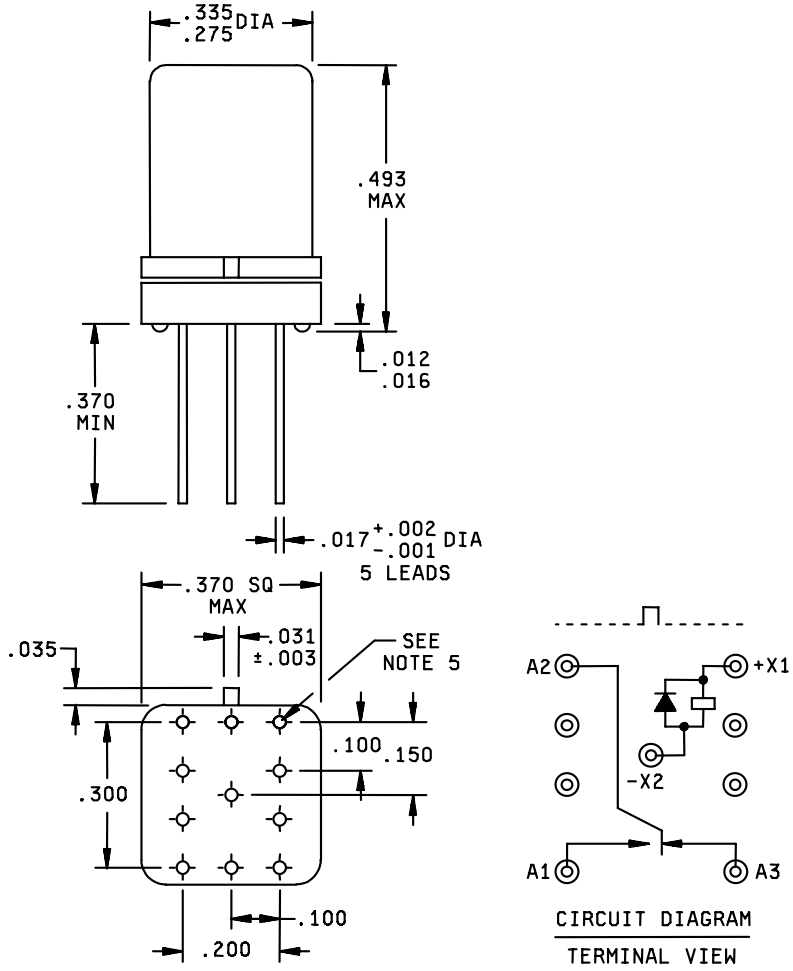
The complete requirements for acquiring the relays described herein shall consist of this specification sheet and the latest issue of MIL-PRF-39016.



Inches	mm
.001	0.03
.002	0.05
.003	0.08
.017	0.43
.031	0.79
.035	0.89
.200	5.09
.275	6.99
.335	8.51
.370	9.40
.375	9.53

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is ±.010 (0.25 mm).
4. Terminal numbers shown above are for reference only. Numbers do not appear on the relay.
5. Relays shall have a plus (+) sign placed on the circuit diagram as shown.
6. Coil symbol optional in accordance with MIL-STD-1285.
7. Circuit diagram shown on part is the terminal view.

FIGURE 1. Dimensions and configuration.



Inches	mm
.001	0.03
.002	0.05
.003	0.08
.012	0.30
.016	0.41
.017	0.43
.031	0.79
.035	0.89
.100	2.54
.150	3.81
.200	5.08
.275	6.99
.300	7.62
.335	8.51
.370	9.40
.493	12.52

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. Spreader mounting pads shall comply with the requirements of A-A-55485, A-55485/05-004.
5. Dimensions and tolerances shown for the bottom view of the spreader mounting pad are for the center-to-center locations of the holes in the spreader mounting pad.
6. Shape optional within envelope dimension.
7. Terminal numbers shown above for reference only. Numbers do not appear on relay.
8. Relays shall have a plus (+) sign placed on the circuit diagram as shown.
9. All leads shall be electrically insulated from the case.
10. Coil symbol optional in accordance with MIL-STD-1285.
11. Circuit diagram shown on part is the terminal view.

FIGURE 2. Dimensions and configuration relay supplied with spreader mounting pad attached.

REQUIREMENTS:

CONTACT DATA:

Load ratings:

High level (relay case grounded):

Resistive:
1.0 ampere at 28 V dc.
250 milliamperes at 115 V ac 60 and 400 Hz case not grounded.
100 milliamperes at 115 V ac 60 and 400 Hz case grounded.

Inductive load: 0.2 ampere at 28 V dc with 0.32 henry inductance.

Lamp: 0.10 ampere at 28 V dc.

Low level: 10 to 50 μA at 10 to 50 mV dc or peak ac.

Intermediate current: Applicable.

Contact resistance or voltage drop:

Initial: 0.10 ohm maximum (0.125 ohm maximum with spreader mounting pad attached).

High level:

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

After life: 0.20 ohm maximum (0.225 ohm maximum with spreader mounting pad attached).

Low level:

During life: 33 ohms maximum.

After life: 0.15 ohm maximum (0.175 ohm maximum with spreader mounting pad attached).

Intermediate current:

During: 1 ohm maximum.

After: 0.20 ohm maximum (0.225 ohm maximum with spreader mounting pad attached).

Contact bounce: 1.5 milliseconds 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. Not applicable to ac load ratings.

COIL DATA: See table I.

Operate time: 4.0 ms maximum over temperature range with rated coil voltage.
Release time: 7.5 ms maximum over temperature range from rated coil voltage.

ELECTRICAL DATA:

Insulation resistance: 10,000 megohms minimum at 500 V dc, except the resistance between coil and case at high temperature shall be 1,000 megohms minimum.

Dielectric withstanding voltage:

	Sea level V rms (60 Hz)	Post intermediate current life test 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	500	
Between case, frame, or enclosure and coils.	500	500	300
Between all contacts and coils.	500	500	All terminals to case
Between open contacts in the energized and de-energized positions.	500	375	
Between contact poles.	N/A	N/A	
Between coils of dual coil relays.	N/A	N/A	

DIODE CHARACTERISTICS: 1/

Maximum transient voltage: 1 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 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 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 B (75 g's). Contact chatter shall not exceed 10 microseconds maximum for closed contacts, and 1 microsecond maximum closure for open contacts.

Magnetic interference: Applicable.

1/ WARNING: Reverse polarity on coil terminals will destroy diode.

Resistance to soldering heat: Applicable.

Acceleration: Applicable.

Salt atmosphere (corrosion): In accordance with MIL-STD-750, method 1041.

PHYSICAL DATA:

Terminal strength MIL-STD-202, method 211:

Pull test: Test condition A, 1 pound pull.

Bend test: Test condition C, ½ pound load.

Twist test: As specified in MIL-PRF-39016.

Solderability: Applicable.

Dimensions and configuration: See figure 1 and 2.

Weight: 2.84 grams (0.10 ounce) maximum, 3.09 grams (0.109 ounce) maximum with spreader mounting pads attached).

Seal: Hermetic.

Minimum marking: Military part number, “J” with the date code (example J0430), circuit diagram, and manufacturer’s name or source code.

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): M39016/25- (dash number from table I and suffix letter designating failure rate level).

TABLE I. Dash numbers and characteristics. 1/

Dash numbers 2/				Coil voltage (V dc) 3/		At 25°C				Over temperature range		
Lead length 1.500 min 4/	Lead length .187 ±.010	Lead length .500 min	Relays with spreader mounting pads (fig. 2) 5/	Rated	Max	Coil resistance ohms 10%	Specified pick-up value (volt.) (V dc)	Specified hold value (volt.) (V dc)	Specified drop-out value (volt.) (V dc)	Specified pickup value (volt.) (V dc)	Specified hold value (volt.) (V dc)	Specified drop-out value (volt.) (V dc)
017	025	033	041	5.0	8.0	125	2.8	1.7	0.23	3.7	2.4	0.15
018	026	034	042	6.0	11	255	3.5	2.0	0.28	4.5	2.8	0.18
019	027	035	043	12	22	1,025	7.0	4.0	0.63	9.0	5.6	0.40
020	028	036	044	26.5	45	4,000	14.2	8.0	1.37	18	10.4	0.89
021	029	037	045	32	57	6,500	18.7	10.6	1.59	24	15	1.0
022	030	038	046	40	75	11,000	23.3	13.3	2.0	30	18.7	1.3
023	031	039	047	9.0	16	630	5.3	3.0	0.54	6.8	4.2	0.35
024	032	040	048	18	33	2,300	10.5	6.0	0.91	13.5	8.4	0.58

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 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, 017L - - - - - -48R.

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

4/ 1.500 leads are inactive for new design.

5/ Relays supplied with spreader mounting pads (-041 through -048) shall have the spreader mounting pad rigidly attached.

QUALIFICATION INSPECTION:

Qualification inspection and sample size: See table II.

TABLE II. Qualification inspection and sample size. 1/

Single submission	Group submission	
18 units plus 1 open unit for level L at C = 0 2/ 33 units plus 1 open unit for level M at C = 0 2/ Qualification inspection as applicable	M39016/25-036	18 units plus 1 open unit for level L at C = 0 2/ 33 units plus 1 open unit for level M at C = 0 2/ Qualification inspection as applicable
	M39016/25-033 M39016/25-034 M39016/25-035 M39016/25-037 M39016/25-038 M39016/25-039 M39016/25-040	2 units each PIN Qualification inspection, Q2.

1/ For retention of qualification or extension of qualification to lower failure rate levels, all life test data accumulated on MIL-PRF-39016/16, /21, and /26 may be used in addition to MIL-PRF-39016/25 data. Prior to performance of retention of qualification testing, the relay manufacturer shall preselect the sampling plan.

2/ 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 inspection, the relay manufacturer shall preselect the sampling plan.

Initial qualification of relays supplied with spreader mounting pads (-041 through -048), shall be tested as specified below:

Perform the following tests as specified in the qualification inspection table of MIL-PRF-39016, in the order shown below:

Before installation of spreader mounting pad; screening, visual and mechanical examination (internal), thermal shock, resistance to solvents, vibration (sinusoidal), vibration (random), shock (specified pulse), acceleration, terminal strength, magnetic interference (when specified), capacitance (when specified), coil life (applicable to continuous duty relays only), resistance to soldering heat, salt spray (corrosion), overload (applicable to high level relays only), life, terminal strength, and intermediate current.

After installation of spreader mounting pad perform the following tests as specified in the qualification inspection table of MIL-PRF-39016, in the order shown below:

Insulation resistance, dielectric withstanding voltage, static contact resistance; specified pickup, hold, and dropout values (voltages), coil resistance, operate and release time, contact dynamic characteristics, coil transient suppression (when specified), solderability, seal, visual and mechanical inspection (external).

Qualification inspection (reduced testing for previously qualified relays) for relays supplied with spreader mounting pads (-041 through -048), two (2) units of the 26.5 volt rated coil voltage (-044) shall be tested as specified below:

Before installation of spreader mounting pad perform the following tests as specified in the qualification inspection table of MIL-PRF-39016 in the order shown below:

For failure rate level L only. Screening.

For failure rate levels M, P, and R: Vibration (sinusoidal) test duration shall be 10 minutes, vibration (random), and screening.

After installation of spreader mounting pad perform the following tests as specified in the qualification inspection table of MIL-PRF-39016 in the order shown below:

Insulation resistance, dielectric withstanding voltage, static contact resistance, specified pickup, hold, and dropout values (voltages), coil resistance, operate and release time, contact dynamic characteristics, coil transient suppression (when specified), solderability, seal, visual and mechanical inspection (external).

Group A testing for relays supplied with spreader mounting pads (-041 through -048) shall be tested as specified below:

Perform seal test immediately, preceding the subgroup A2 electrical tests. Relay leads shall be formed and the spreader mounting pad removed before the seal test. After the seal test, the spreader mounting pad shall be rigidly attached to the relay and the remaining group A tests performed.

Qualification inspection (reduced testing) and sample size: See table III. If the relays produced for MIL-PRF-39016/25 are similar in construction and design except for the diodes, headers and coil assemblies, as applicable, to the relays produced for MIL-PRF-39016/16, /21 and /26, then reduced testing for qualification of MIL-PRF-39016/25 relays may be performed concurrent with or subsequent to successful qualification of MIL-PRF-39016/16, /21 and /26. For reduced testing, see table III.

TABLE III. Qualification inspection (reduced testing).

Examination or test
2 units each coil voltage - Q2 of qualification inspection table 1 unsealed sample unit for internal examination.

SUPERSESSION DATA:

Supersession data: See table IV.

TABLE IV. Supersession data. 1/

Superseded part no. M39016/25-	New part no. M39016/25- 1/		Superseded part no. M39016/25-	New part no. M39016/25-
001	017		009	027
002	018		010	028
003	019		011	029
004	020		012	030
005	021		013	023
006	022		014	024
007	025		015	031
008	026		016	032

1/ Dash numbers -017 through -024 are inactive for new design and are for support of existing equipment designs only.

Cross reference for Government logistical support: See table V.

TABLE V. Cross reference for Government logistical support.

Superseded part no. M39016/25-	New part number M39016/25-	Support with part number M39016/		New part number M39016/25-	Support with part number M39016/
001	017	25-017		033	25-033
002	018	25-018		034	25-034
003	019	26-019		035	26-035
004	020	26-020		036	26-036
005	021	26-021		037	26-037
006	022	26-022		038	26-038
007	025	25-033		039	26-039
008	026	25-034		040	26-040
009	027	26-035		041	25-041
010	028	26-036		042	25-042
011	029	26-037		043	26-043
012	030	26-038		044	26-044
013	023	26-023		045	26-045
014	024	26-024		046	26-046
015	031	26-039		047	26-047
016	032	26-040		048	26-048

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

A-A-55485, /5
MIL-PRF-39016/16, /21, /26
MIL-STD-202
MIL-STD-750
MIL-STD-1285

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 - 11
DLA - CC

Review activities:
Army - AR
Navy - AS, MC, OS, SH
Air Force - 99

Preparing activity:
DLA - CC

(Project 5945-1259)

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://www.dodssp.daps.mil